The use of local knowledge for the defence and sustainable management of mangrove ecosystems: the case of Ecuador

Patricia Ocampo-Thomason

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Abstract

Shrimp aquaculture is one of the fastest growing economic activities in the tropical coastal zone. In Ecuador, the shrimp farming industry has grown exponentially since its introduction in 1969 and is now the main producing country of cultured shrimp in Latin America. But its rapid and uncontrolled expansion has led to a 57% reduction of mangrove forest in the country, and has had considerable impacts on the poor afro-Ecuadorian coastal communities decreasing the area available to them for obtaining their livelihoods. In turn this has generated a breakdown in the traditional resource allocation and management strategies, further adding to the social exclusion of already marginalised groups who are mainly Afro-Ecuadorians.

This thesis explores the complexities of social, political and economic changes that have arisen in mangrove communities since the introduction of shrimp farming in the Mangrove Ecological Reserve (REMACAM). Located in the north of the Esmeraldas Province this is the last pristine mangrove ecosystem in Ecuador, harbouring some 6,000 traditional inhabitants. The research focuses on how the affected populations have responded to these changes, and how they have engaged with national neo-liberal reforms in order to be able to defend and manage the ecosystem.

Research focuses on the dichotomous way in which mangroves are perceived in Ecuador today. Outsider perceptions see mangroves as mosquito ridden wastelands. This representation has made possible the development and expansion of the shrimp farming industry at the expense of the mangrove ecosystem. On the other hand, insider perspectives see mangroves as a multiple use ecosystem and a livelihoods provider. These understandings have been successfully used by the mangrove defence movement (C-CONDEM) to create a strong movement against the shrimp farming industry. Using an insider perspective the mangrove defence movement has engaged with the country's neo-liberal reforms, created national and international alliances and has also created a new political space of resistance. This space includes challenging, and changing national legislation, and proposing new legislation and management strategies to defend the mangroves and the traditional communities whose livelihoods depend on the ecosystem.

Contents

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Acronyms

ANA: National Environmental Assembly (Ecuador)

ANC: National Constitution Assembly (Ecuador)

APACOBIM: Asociación de Pescadores Artesanales Olmedo y Majagual

BIA: Bilateral Aid Agencies

BMP: Best Management Practices

CANE: Gran Comarca Territorial

C-CONDEM: National Mangrove Defence Coordination

CEC: Commission of the European Community

CEDENMA: Ecuadorian Committee for the Wildlife and Environmental Defence

CENAIM: National Center for Aquaculture and Marine Research (Ecuador)

CIDA: Canadian International Development Agency

CLIRSEN: Remote Sensor Centre for Natural Resources (Ecuador)

CMD: Unique Decentralization Agreement (Ecuador)

CNA: National Aquaculture Chamber (Ecuador)

CND: National Decentralization Commission (Ecuador)

CNE: National Congress Ecuador

COC: Code of Conduct

CODAE: Corporation for Afro-Ecuadorian Development

CODENPE: National Development Council of Nationalities and Peoples of Ecuador

CONAM: National Commission for Decentralization and Territorial Reordering (Ecuador)

CONCOPE: Province Council Consortium (Ecuador)

CONESUP: higher education council (Ecuador)

CPR: Common Property Regimes

DANIDA: Danish International Development Agency

DEMNS: Decentralized Environmental Management National System (Ecuador)

DIGMER: General Directorate of the Merchant Maritime (Ecuador)

DINAF: General Forestry Development Directive (Ecuador)

EJF: Environmental Justice Foundation (UK)

EML: Environmental Management Law (Ecuador)

FAO: United Nations Food and Agriculture Organization

FEDARPOM: Frente Artesanal Afro de recolectores de Productos Bioacuáticos del Manglar San Lorenzo

FEDARPROBIM: Frente Artesanal Afro de recolectores de Productos Bioacuáticos del Manglar Eloy Alfaro

FEPALUM: Palenque Humedales (Ecuador)

FEPP: *Fondo Ecuatoriano Popularum Progressio*

FIGIS: Fisheries Global Information System- FAO

FIPIS: Fisheries Project Information System- FAO

FUNDECOL: Foundation for the Ecological Defence (Ecuador)

GAA: Global Aquaculture Alliance

GIS: Geographical Information System

GLOBEFISH: Global Fisheries Unit for Information on International Fish Trade

GPA: Global Programme of Action for the Protection of the Marine Environment from Land-based Activities -UNEP

GTZ: German Development Agency

HIVOS: Humanist Institute for the Cooperation with Developing Countries, Netherlands

IADB: Inter-American Development Bank

IBRD: International Bank for Reconstruction and Development

ICOD: International Centre for Ocean Development

IDB: International Development Bank

IFC: International Finance Corporation

IFI: International Finance Institutions

IIRR: International Institute for Rural Reconstruction

IK: Indigenous Knowledge

ILO: International Labour Office

IMF: International Monetary Fund

IMO: International Migration Organization

INDA: National Institute for Agrarian Development (Ecuador)

INEFAN: National Forestry Institute (Ecuador)

INFOFISH: Intergovernmental Organization for Marketing Information and Technical Advisory Services Asia-Pacific

INP: National Fisheries Institute (Ecuador)

ISA-Net: Industrial Shrimp Action Network

ISI: Import Substitution Industrialization

JICA: Japan International Cooperation Agency

LAC: Latin America and Caribbean Region

LK: Local Knowledge

MAG: Ministry of Agriculture (Ecuador)

MAP: Mangrove Action Project

MCL: Mangrove Conservation Law (Ecuador)

MDAA: Multilateral Development Assistance Agencies

MIC: Ministry of Industry and Commerce (Ecuador)

MoD: Ministry of National Defence (Ecuador)

MoE: Ministry of Environment (Ecuador)

NACA: Network of Aquaculture Centres in Asia-Pacific

NASO: National Aquaculture Sector Overview -FAO

NCC: National Co-ordination Commission (Ecuador)

NCSD: National Council of Sustainable Development (Ecuador)

NGO: Non-Governmental Organization

NMFS: National Marine Fisheries Services (USA)

NORAD: Norwegian Agency of Development and Cooperation

NSPA: National System of Protected Areas (Ecuador)

NTAE: Non-Traditional Exports

OA: Open Access Regime

OCAME: *Campesino* Movement of Muisne (Ecuador)

ODA: Overseas Development Agency

PASI: People's Alliance Against Shrimp Farming Industry

PCN: Black Communities Process (Ecuador)

PLS: Shrimp Post-Larvae

PMRC: Management of Coastal Resources Program

PRODEPINE: Indigenous and Afro-Ecuadorian Peoples Development Project

R.O: Official Registry (Ecuador)

REMACAM: Mangrove Ecological Reserve Cayapas-Mataje

RPC: regional *Palenque* Council

SAP: Structural Adjustment Programs

SES: Socio-Economic Survey

SIDA: Swedish International Development Agency

SIFAR: International Fisheries and Aquatic Research

SOFIA: State of Fisheries and Aquaculture

SSNC: Swedish Society for Nature Conservation

SWISSAID: Switzerland Aid Foundation

TSV: Taura Syndrome Virus

TTC: The Tragedy of the Commons

UICN: International Conservation Union

UNCED: United Nations Conference on Environment and Development (Rio, 1992)

UNCSD: United Nations Commission on Sustainable Development

UNDP: United Nations Development Program

UNEP: United Nations Environmental Programme

UONNE: Unión de Organizaciones Negras del Norte de Esmeraldas (Ecuador)

USAID: United States Agency of International Development

VAT: Value Added Tax

WAS: World Aquaculture Society

WB: World Bank

WRI: World Resource Institute

WSSV: White Spot Syndrome Virus

WWF: World Wildlife Foundation

Chapter 1 - Introduction

1.1 A personal exploration of interdisciplinarity

This thesis is the culmination of a long journey. A journey that started many years ago when as a very young marine biology student I visited the Pacific coast of Colombia for the first time. In the middle of the poverty stricken communities we were visiting our lecturer looked at us and said: "our duty is not just to study and protect the coastal ecosystems, but to try to improve the living conditions of the people here". In Colombia education is a privilege, a privilege that comes with a social duty, it is impossible to ignore the poverty around us, especially in the coastal areas. Although my lecturer's comment was the only social argument I came across during my five years at the University, it left a very important imprint in my mind.

Marine biology at *Universidad del Valle* was based on conventional biological training: rigorous quantitative description of marine resources. The premise was that quantitative information about natural resource was essential for any kind of management. We learnt theoretical models, to identify problems, to do experimental design with control variables, to observe, to measure, to evaluate and to analyze. Although there are tens of thousands of kilometres occupied by millions of people who depend for their livelihood on the near-shore fisheries and coastal resources, there was not a single module that allowed us to explore the dynamic interactions between societies and the marine environments we studied. Humans were seen merely as managers or stressors, the relationship nature-humans was always presented as one of exploitation: in the case of fragile marine ecosystems such as sea-grasses and corals, the only way to preserve the ecosystem was to exclude the people. Marine protected areas were the fashion in those years; I remember celebrating with my classmates when the government declared the first Marine Natural Reserve on the pacific coast of Colombia.

Then in my final year at the university I went to live with a mangrove community in the Malaga Bay area, to conduct a year's research. There I started realizing the importance of human-nature interactions and how badly equipped I was to understand the local communities that depended on those coastal ecosystems that I should be conserving. During my twelve month's research and the subsequent two years I lived in the area, I

came to understand the importance of the fisher-people's experiences and how they knew so much about the surrounding environment: how they knew where to find fish, where the fish fed and reproduced, the different stages of commercial species, their incredible knowledge about the currents in the area, and the changes according to the tidal cycles.

I started to work more and more with the fisher-people, asking them about locations, species, suitability of areas, etc. The locals were more than happy to share their knowledge with me and I started a very good fruitful relationship, which gave me a better understanding of the coastal environment than the one I have learned from books. My enthusiasm contrasted with the criticism I received from my two fellow team mates. They got really upset about me following the fisher-people instructions; for them this was a sign of weakness, "we were the university students, we know better", those were some of the remarks I received from them. They assumed I was relying on the fishermen because I was incapable and did not have enough expert knowledge on some of the subjects. I think they never recognized that the incapacity was theirs, they were unable to recognize that universities are not the only places that produce knowledge, that knowledge can be produced anywhere and that the fisher-people have an incredible knowledge of their surroundings that has allowed them to survive in those conditions, that knowledge is not only learned in the books but through our daily interactions with the systems we use.

At that time, more than 15 years ago, there was little talk among natural scientists about indigenous knowledge, participatory management or conservation. Neither were interdisciplinarity or sustainability part of traditional natural science training. The conceptual shifts that have introduced some of these ideas into marine and ecological sciences have occurred in the last 10 years. Now it is becoming increasingly important to incorporate the dynamic interactions between societies and natural systems. Several important authors argued that we can ill afford to consider humans separately from nature, especially in today's heavily human-dominated world (Kates *et al.* 2001, Gunderson& Holling 2002). Pioneers such as Berkes used the term social-ecological system to refer to the integrated concept of humans in nature (see for example: Berkes& Folke 1998, Berkes *et al.* 2003). He advocates for the inclusion of humans back into the ecosystem (Berkes 2004). To be able to do that, it is necessary to use all possible sources of ecological knowledge and understandings available. Such approaches produced another conceptual shift in ecology, the use of indigenous and local knowledge for the management and

conservation of natural resources. The use of knowledge and perspectives from the community level, some authors argue can help build a more complete information base than may be available from scientific studies. Johannes (1998) made a very good case for data-less marine resource management, he argues that we do not have the resources to collect and process management data for the great majority of tropical ecosystems (coral reefs, sea-grasses, mangroves), so he urges the adoption of a data-less-management, a system based on knowledge possessed by traditional fishers. These conceptual shifts pertain to an emerging understanding of ecosystems as complex adaptive systems in which human societies are necessarily an integral part (Berkes 2004), and an acknowledgement that resource users can play a vital role in the management of the resources upon which they depend. Thus interdisciplinary research in social sciences helps to provide a more nuanced understanding of these processes. Although these changes are becoming more and more mainstream, they are still not widely disseminated and there is still a long way to go.

While all these changes were going on in the international debates on ecology and marine sciences, in my daily experiences working with coastal communities I continued to be focused on the need to incorporate human-nature and political interactions into the management of artisanal fisheries. I wanted to understand why people use the ecosystems the way they do, how communities are able to participate in the management of their own resources, and how to avoid the destruction of the natural/social systems within environments such as mangroves. Also I was aware of how external changes were having an effect in the local communities where I was working. Looking to understand all these issues, to learn social sciences and methodologies and combine them with my natural sciences expertise I enrolled for a master's degree course that offered a combination of social, economic and political aspects of coastal management. Unfortunately the course fell short of its promises and the social aspects were treated in a single afternoon's workshop! Again the hard facts were the most important aspect; I learned to use all sort of tools such as GIS, ecological foot print, carrying capacity; special computer programs such as Primer, Eco-path, and so on. All of them were very interesting tools but have exactly the same methodological basis as my marine biology degree; they relied or were based on quantitative reasoning through scientific investigation, in the end it all came back to the same aspect, collecting quantitative data.

After this experience I decided to write my own proposal, to look for a supervisor and a discipline which allowed me to learn about the interactions between nature and societies, and in human geography I found them and this thesis is the result of this long journey. This thesis is my first attempt to overcome my disciplinary boundaries and my theoretical affiliations. To surmount the cognitive constraints of learning a second discipline, appropriating and accommodating methodologies and languages and trying to build common bodies of knowledge and practice.

1.2 Exploring nature-society interactions through a political ecology approach

In order to add to the theoretical examination of nature-society interactions and to explore the social, political and economic complexities of mangrove destruction and defence in the face of shrimp farming development in Ecuador, this thesis engages with the political ecology approach. Political ecology is a multidisciplinary field that has its roots in neo-Marxism and political economy, and has been influenced more recently by social movements theory and post-structuralism (Bryant& Bailey 1997). Also, as examined by Zimmerer and Bassett (2003b), the field of political ecology has produced a number of studies that have significantly contributed to the understanding of nature-society relations from a geographical perspective. In this research I identify in particular with the geographical political ecology approach described by Zimmerer and Bassett (2003a, p.2).

The geographical approach to political ecology allows for a serious engagement with the biophysical as well as the social worlds. In this approach, the environment is not simply a stage or arena in which struggles over resource access and control take place but plays an active role in shaping human-environment dynamics (Zimmerer& Bassett 2003a, p.3). This perspective contrasts with the 'environmental politics' or 'politicised environment' that dominates current political ecology research (Peet& Watts 1996, Bryant& Bailey 1997, Stott& Sullivan 2000, Peet& Watts 2004) and, in adopting this approach, I am also trying to engage with recent controversial debates over the role of ecology in political ecology. Authors such as Vayda and Walters (1999) have argued that an overreaction to the 'ecology without politics' of three decades ago has resulted in a 'politics without ecology'[1] (p.168), Walker (2005), on the other hand, counter-argues that

[1] The argument 'politics without ecology' is also presented by Basset and Zimmerer (2004,, p.103).

despite the claims of critics a great deal of research in political ecology engages with biophysical ecology as a central concern (p. 73).

In focusing on mangroves as the central element of my research and analysis, I engage both the ecological and political dimensions of mangrove management in a more balanced and integrated manner. I try to retain the 'ecology' identity without losing sight of the politics and culture of representation of 'nature' and the narratives that give form and meaning to the community-mangrove interactions. I also show how, in the struggle to defend the ecosystem, its ecology is playing a dynamic role and in this struggle mangroves have become an agent in their own right. Using mangroves as the articulating element of my analysis also allows me to cover a considerable number of issues from shrimp farming development, local knowledge and social movements, to issues of governance, neo-liberal reforms and decentralization. Mangroves act as the thread that interlinks this somehow disparate set of areas.

Another main theme in political ecology and cognate subfields (cultural ecology) is the worldwide expansion of conservation management areas. Political ecology research in this theme has increasingly sought to elucidate how the establishment of conservation areas is both incorporated into the everyday lives of persons who live in or near them and how in some instances these areas are contested. Some of the research shows how the unfolding of this new conservation geography has resulted in many cases in forced displacement of local people who often are economically poor and socially disadvantaged. The case of mangroves in Ecuador and the creation of the REMACAM allows me to engage with this new debate (called by Zimmerer 2006 the 'new geography of conservation and globalization'). Particularly apposite for this research is the rapid growth of the interface of conservation areas with livelihoods of resource users and the discursive strategies that are deployed in broadening the environmental discourse in the search for sustainability, a topic that is central to political ecology of the recent past (see for example: Nygren 2004).

The increased interface of conservation areas with resource use and livelihood issues is an integral part of the "third wave" of conservation that emerged during the late 1980s and early 1990s. Third wave refers to the shift to sustainability as one of the defining goals of conservation worldwide. The interface of conservation areas with persons involved in resource use is far more widespread in developing countries due to the existence of more

dense rural populations whose livelihoods depend on forms of resource extraction (Klooster 2003, Works& Hadley 2004).

The proliferation of conservation territories has depended on the extension of existing types of units as well as the rapid evolution of novel management spaces such as community conservation areas. Entwining of globalization and conservation has led to an unprecedented variety and extent of spatial arrangements whose environmental management goals and prescribed activities vary from strict nature protection to sustainable utilization. The REMACAM is an excellent example of these new conservation territories; its creation due to pressure of the communities and it's *sui-generis* co-management make it what we can call a new hybrid conservation space, it also shows how the local communities are using conservation areas and conservation regulation to protect the mangrove ecosystem and the livelihood that depend on them.

Engagement with political ecology also opens the possibility for a serious discussion of how nature and environmental problems are represented and how discursive formations shaped policy and practice. Some authors in political ecology are optimistic about the ability for social movements to re-frame environmental policy or discourses in favour of marginalized groups. For example the discursive or 'liberation ecologies' approach suggest that when social movements are allowed to emerge from subaltern voices they can successfully reframe environmental discourse (Peet& Watts 1996). However authors such as Forsyth (2003) argued that in many cases social movements replicate and reinforce pre-existing structures of environmental debate, rather than reframe these in favour of marginalized groups (p.166). This research offers a fascinating account of how the mangrove defence movement is not only re-framing the environmental discourse around mangroves in the country, but also is successfully using mangrove communities' insider perspective to contest and change the way mangroves are managed and legislated by the government.

Changes in legislation and institutional arrangements for mangrove use and management return us to one of political ecology's main themes: decentralization. Decentralization has emerged as an important instrument of environmental and development policy in the last two decades (Agrawal& Gupta 2005). The perspective of political ecology typically suggest that environmental governance at the local level is

politically necessary and pragmatic for the socially just undertaking of conservation and environmental management (Stevens 1997). However academic and policy literature suggest that decentralization is a highly complex, situation-specific process fraught with obstacles (World-Bank 2000, 2001, Larson 2002). In the case of Latin America for example, decentralization has most often been instigated hurriedly and in a disorganized fashion reacting to local demands and political pressure rather than being part of an organized central government plan (Rojas 1999). The process of environmental decentralization in Ecuador provides an excellent case to engage with this debate, showing for example how without real mechanisms for social participation and without proper devolution of technical and financial resources, decentralization is leaving the people behind and un-protecting natural resources such as mangroves.

By engaging with the political ecology approach, this thesis is an inherently geographical project. Geography is the 'disciplinary home' of political ecology, although it also has close ties to other disciplines such as sociology and anthropology. Both geography and political ecology share an interest in the complexities of human-environment interactions (Bryant& Bailey 1997), because, as the eminent geographer David Harvey commented, 'all ecological projects (and arguments) are simultaneously political-economic projects (and arguments) and vice versa. Ecological arguments are never socially neutral any more than socio-political arguments are ecologically neutral' (quoted in: Sundberg 1998).

Some authors have argued that political ecology will soon become 'the *status quo* in human-environment research in geography' (Walker 2003). Geography is concerned with how the 'lived dimensions of social life' are continually constructed through both material practices and discursive processes (Rangan 2000). This thesis explores the meanings and 'lived dimensions' of mangrove struggle for a group of actors in Ecuador. For geographers, questions of meaning are not considered in the abstract, but with respect to particular material and social conditions (Peet& Watts 1993).

1.3 Why shrimp farming vs. mangroves?

Human geography is the discipline that allowed me to learn and explore nature-society interactions, and the development and expansion of the shrimp farming industry at the expense of mangrove ecosystems and the communities that depend on them, provided

me with the perfect topic to explore the complexities of social, political and economic changes in coastal communities. Mangroves are salt-tolerant trees found along low-energy tidal shorelines in tropical and to a minor extent sub-tropical areas. They provide the basis for a complex and extensive ecosystem at the interface of terrestrial, freshwater and marine ecosystems (Robertson& Alongi 1992). They are the most prominent coastal ecosystem in tropical areas of the Caribbean, Latin America, Africa and Asia and provide many important functions for humankind, among them a wealth of natural resources, protection against devastating storms and breeding grounds for many species of commercial food value. Chapter 4 shows how mangroves have played a pivotal role in the development and maintenance of coastal communities in Latin America. However, the scale of human impact on mangroves has increased dramatically over the past three decades or so, and today mangroves are considered one of the world's most threatened ecosystems (see chapter 2, section 2.3.1.1). Although the causes of mangrove loss are fiercely debated, it is possible to find a correlation between the development of the shrimp farming industry and mangrove depletion (see table 2.10 in chapter 2). Mangrove loss due to shrimp farming development has become a very interesting battle ground between local communities, environmentalists and the shrimp farming industry. As will be presented and analysed in chapter 2 the shrimp farming industry has destroyed coastal environments and traditional communities around the developing world and has sparked an international grassroots resistance movement against the industry. The introduction of shrimp farming in Ecuador (see chapter 2, section 2.6) was massive and uncontrolled resulting in a 57% loss of mangroves and the displacement of traditional communities. These communities have found a voice in the mangrove defence movement and their process provided a perfect case study for me to explore how people use and manage the mangrove ecosystem, how communities are able to participate in the defence of their natural resources and how they are creating new strategies to avoid the destruction of the mangrove ecosystem and the livelihoods associated with them.

1.4 The research questions

- Has the development of the shrimp farming industry altered patterns of resource use and allocation in the mangrove communities and given rise to new social organisations for mangrove defence in Ecuador?

- What are the strategies used by mangrove defence organizations in their struggle against the shrimp farming industry? How are they engaging with new neo-liberal reforms in the country?

- What roles are played by local knowledge in political mobilisations around the defence of mangrove ecosystems in the context of neo-liberal economic development and decentralisation?

- What is the role of local knowledge and social practices in the creation of new management strategies for the sustainable use and management of mangroves in Ecuador?

1.5 Structure of the thesis

Chapter 2 traces the development and expansion of the shrimp farming industry in the last decades, showing how virtually all of the world's farmed shrimp is produced in the global south. It also shows how the shrimp farming industry developed in Latin America and what the future trends in the region are. Then the role of the demand and assistance of the international financial institutions is explored showing how the rapid development and expansion of the shrimp farming industry in developing countries has been to a large extent fostered by the assistance of the international finance institutions. The next section provides an analysis of the environmental and social costs and benefits of the shrimp farming industry. This section includes the effects of the shrimp farming development on the mangrove ecosystems, its effect on food security and on the marginalization of local communities. The subsequent section presents some of the externalities of the shrimp farming industry, showing how this is a highly subsidized industry which has proven to be vulnerable to boom and bust cycles due to market changes and epidemic diseases. Having established the debates surrounding the industry, the next section explores how local communities, national and international NGOs have formed a global resistance movement against the shrimp farming industry and examines how the industry has responded to this organised opposition. The last two sections provide an overview of the development of the industry in Ecuador, showing how at least 57% of the mangroves have been lost in the last 30 years and how this loss is attributed to the development of the shrimp farming industry, which in turn has generated the creation of a mangrove defence movement.

Having established the context for the introduction of shrimp farming in Ecuador, **Chapter 3** discusses the methodological issues raised in the process of designing the research and completing this thesis. The first section discusses the concept of local knowledge and why it is a suitable research focus through which to explore how historical and cultural precedents influence the way in which people react to, understand and engage with socio-economic changes resulting from external reforms and pressures. The second section includes an analysis of the term local knowledge and the different terminologies used by researchers and scholars when referring to the knowledge held by local communities. The section finishes with the presentation of the definition adopted for this research. The next section introduces the different methods used in the research, including a reflection about some of the reasons behind the adoption of ethnographic and participatory methods. The section also analyses the role of the researcher in the participant-observer continuum and how the encounters with the different social actors influenced the events being studied and shifted part of the focus of the research, giving more prominence to some of the issues. The section ends up with an exploration of the data analysis process and the difficulties encountered when trying to slot data into pre-determine categories of analysis and how the end result draws on the totality of the research experience.

In order to understand the relationship between mangroves and their dwellers, the first empirical chapter, **Chapter 4**, introduces mangrove biological and ecological characteristics. The next section presents some of the archaeological evidence showing the important role that mangroves have played in the survival of the American Pacific coastal communities since pre-Columbian times and how the deltaic complex Mataje-Santiago-Cayapas (which constitutes the study area) has been inhabited for hundreds of years and given birth to one of the most advanced coastal cultures in the Americas. This section will also analyse how the mangroves were perceived and used under the Spanish conquest and how those perceptions survived after independence. The last section analyses how local communities have adapted to living among the mangroves, how the inter-tidal conditions have created a specific time management among the mangrove communities based on tidal rhythms and the moon. The last section in the chapter describes the study area, the communities' social and economic characteristics and the mangrove species found in the study area.

Chapter 5 explores how local communities perceive and use mangrove resources and what are the most important direct and indirect uses of mangroves in the study area. Section 5.2 shows how local people have an ample perception of mangrove ecological services and functions. The importance of mangroves as a direct source of forest products and raw materials is explored in section 5.3. The indirect uses of mangroves will be explored in section 5.4. This section shows how local communities fully recognized the important role played by mangroves in the maintenance of local fisheries and totally appreciate the pivotal role mangroves play in their local economies. The most important natural resources extracted from the reserve are shown in section 5.5. This section also analyses how the use and allocation of natural resources in the area is divided along gender and age lines, men fish, whilst women and children gather cockles. The artisanal fishing and the cockle gathering fisheries are examined in detail in order to provide insights into the changes taking place. The last section explores changes in resource allocation and practices in the study area, showing why these changes are occurring and how they are affecting the traditional management of natural resources in the study area.

The idea that mangrove cultural representations and conceptualizations have played a very important role in the way mangroves are managed and defended in Ecuador is unpacked in **Chapter 6.** The first section examines how initial encounters with the ecosystem have created two contrasting perspectives of the same ecosystem. On one hand, the outsiders view that sees mangroves as mosquito ridden, wastelands and help in the depletion of the ecosystem during the shrimp farming boom, and on the other, the insider perspective that sees mangroves as a provider of multiple resources, which in turn is shaping the way mangroves are defended in the country. The following section examines the different common property regimes and the way natural resources such as mangroves are managed under those regimes. The difference between common property and open access regimes is explained and the tragedy of the commons paradigm is introduced as it is used to explain the reasons for the current prominence of community based approaches such as co-management. With these elements in mind, the subsequent section analyses the institutional arrangements for mangrove management in Ecuador. Laws and regulations are explored and also the way the legal framework is used by different mangrove stakeholders is presented.

As this thesis is concerned with the way in which local communities engage with new neo-liberal reforms, **Chapter 7** examines how the Ecuadorian state has been profoundly transformed in the past decade to accommodate new neo-liberal reforms, creating a legal framework to enable local participation and decentralization. The first section shows how the decentralization process is being implemented in the case of natural resources, analysing the new legal framework, the environmental competence transferring agreements and the fate of the natural protected areas system under the new decentralization regime. This section also explores what is happening to mangrove management under environmental decentralization, analysing how the mangrove competences are being transferred and examines whether the municipalities are ready for mangrove management. The last section introduces the different approaches to engage with the new participation and decentralization shift found in the study area. The proposal of the Process of Black Communities (PCN) for the creation of an afro-Ecuadorian territory in the north of the Esmeraldas province: *La gran comarca territorial* (CANE) is presented together with the mangrove defence movement stewardship programme initiated in the REMACAM in 2000. The section also explores the PCN and C-CONDEM proposals for a culturally appropriate education. Finally, the mangrove conservation law presented to the Ecuadorian Congress by the mangrove defence movement is presented and discussed.

Chapter 2 - Introducing neo-liberal industries in the developing world: the development and expansion of the shrimp farming industry

2.1 Introduction

Aquaculture has a long history, tracing its roots back thousand of years. For generations using traditional methods and local materials, rural farmers and fishers used low-intensity systems to grow fish, molluscs and crustaceans. However, the beginning of the 1960s and 1970s saw a transformation in the way aquaculture was practiced when traditional methods were almost entirely replaced by more intensive modern systems. Industrial processes were widely introduced encouraging commercial production, and the revolution of aquaculture started: in development circles it was dubbed the 'Blue revolution'. This revolution has been presented as the answer to the global decline in capture fisheries and the means to contribute much needed protein to a growing human population.

Since 1970 aquaculture has grown at an average compounded rate of 9.2 percent per year compared with only 1.4 percent for capture fisheries and 2.8 percent for terrestrial farmed meat production systems (Tacon 2003), making it the most rapidly growing animal food producing sector. Currently its contribution to global supplies of fish, crustaceans and molluscs is 29% (of total production by weight), compared with 3.9 percent in the 1970s (FAO 2002). With nearly half of world marine stocks offering no reasonable expectations for further expansion[2], and a rise in global demand for seafood[3], coupled with diversification, intensification and technological advances in aquaculture, it is predicted that the expansion of this industry will continue (GESAMP 2001).

However, according to some authors (Edwards 1999, Naylor *et al.* 2000, Stonich 2003), the potential of aquaculture to contribute to world food security and provide alternative sources of social and economic well-being in impoverished rural coastal areas of the world, has been impeded by the emphasis on the cultivation of high-value,

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[2] About 47 percent of the main fishery stocks or species groups are fully exploited and are therefore producing catches that have reached, or are very close to, their maximum sustainable limits (FAO, 2002).

[3] at the present more than 1 billion people worldwide rely on fish as an important source of animal proteins and according to economic modelling, global annual consumption of fish per person will increase over time, from about 16 kg today to between 19 and 21 kg in 2030 (FAO, 2002)

carnivorous species destined for industrial national markets. This is particularly true for industrial shrimp farming. The shrimp farming industry started its development in Asia during the 1970s and since then its development has increased dramatically (see section 2.2).

Currently, shrimp farming is one of the most profitable and fastest-growing segments of the aquaculture industry. Latest estimates suggest there are now at least 1 billion or so consumers who purchase cultured shrimp, with the industry continuing to expand. However, its rapid development has been accompanied by increasingly controversial debates over the environmental, social and economic impacts. There is considerable uncertainty about appropriate policy and management responses, not least because of the perception among some that shrimp culture generates substantial benefits in the tropical coastal regions where the majority of the cultured shrimp is produced.

Initially the debates were centred around the ecological consequences of the industry. However, lately, the debate has moved to the social consequences with issues such as food security and human rights violations taking centre stage. During the last 15 years, local manifestations against the industry have become a global movement which incorporates environmental and social concerns into a common campaign for socially and environmentally sustainable coastal development. Faced with this global opposition, the industry and its advocates have been forced to respond by creating global alliances to counter claims against them and trying to demonstrate that the industry has changed by adopting a more ecological, sustainable approach to its development.

This chapter examines the current state of the shrimp farming industry in the world, detailing where cultured shrimp is produced and what are the factors that have made possible the development and expansion of the industry. The role played by international demand and the international finance institutions is explored in section 2.2.2 and 2.2.3. Section 2.3 analyses the environmental effects and social consequences of the industry, while section 2.4 will try to explore the real price of cultured shrimp and who is paying it.

The global resistance movement against the industry is analysed in section 2.5, looking at how local concerns became a global resistance movement against the industry and how the industry has responded. Section 2.6 and 2.7 details the development and

expansion of the shrimp farming industry in Ecuador and the growth of the social movement against the industry in that country.

2.2 The development and expansion of the shrimp farming industry

Shrimp farming is one of the most profitable and fastest-growing segments of the aquaculture industry. According to the latest report on the state of world fisheries and aquaculture (FAO 2002, 2003c), marine shrimp[4] is the most prominent product in the international trade. Even though shrimp accounted for only 2.6% of total global aquaculture production by weight in 1999, it represented 12.4% of total aquaculture production by value, at US$ 6.7 billion (FAO 2002). In value terms, marine shrimp constitutes the single most valuable, internationally traded aquaculture commodity worldwide (FAO 2000).

Cultured shrimp has been the driving force behind the strong increase in the shrimp trade during the late 1980s and early 1990s. Global farmed shrimp production has grown over 100-fold (by weight) in less than two decades. With under 10.000 metric tons (t) being produced by fewer than a dozen countries in the early 1970s, to over 1 million t by the late 1990s (Tacon 2002) latest estimates suggest, that by 2004, shrimp farming accounted for at least 2 million t, or 50 percent of world shrimp production (Rosenberry 2004). Figure 2.1 shows the growth in production and value of the shrimp farming industry in the last 30 years.

Between 1970 and 2002 shrimp culture has grown an annual average of over 18% worldwide; by contrast, the total catch of shrimp from capture fisheries has grown at a relatively modest rate of 3.8% per year (Tacon 2002). Shrimp farming's slowest rate of growth was observed between 1990-2000 (9,9%). While still significant, this is small when compared to the double-digit growth rates observed during the seventies (23%) and eighties (24%). According to the latest statistics the industry's growth rate has picked-up again (see table 2.1).

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[4] According to FAO terminology, "prawns" refer to freshwater species, while "shrimp" refer to their marine and brackishwater relatives. In common language large shrimp are often called "prawns" and small shrimp "shrimp", irrespective of the salt content of their habitat (Patmasirowat *et al.* 1998:1). This thesis deals with marine shrimp, which according to species and sizes are sometimes referred as to "prawn".

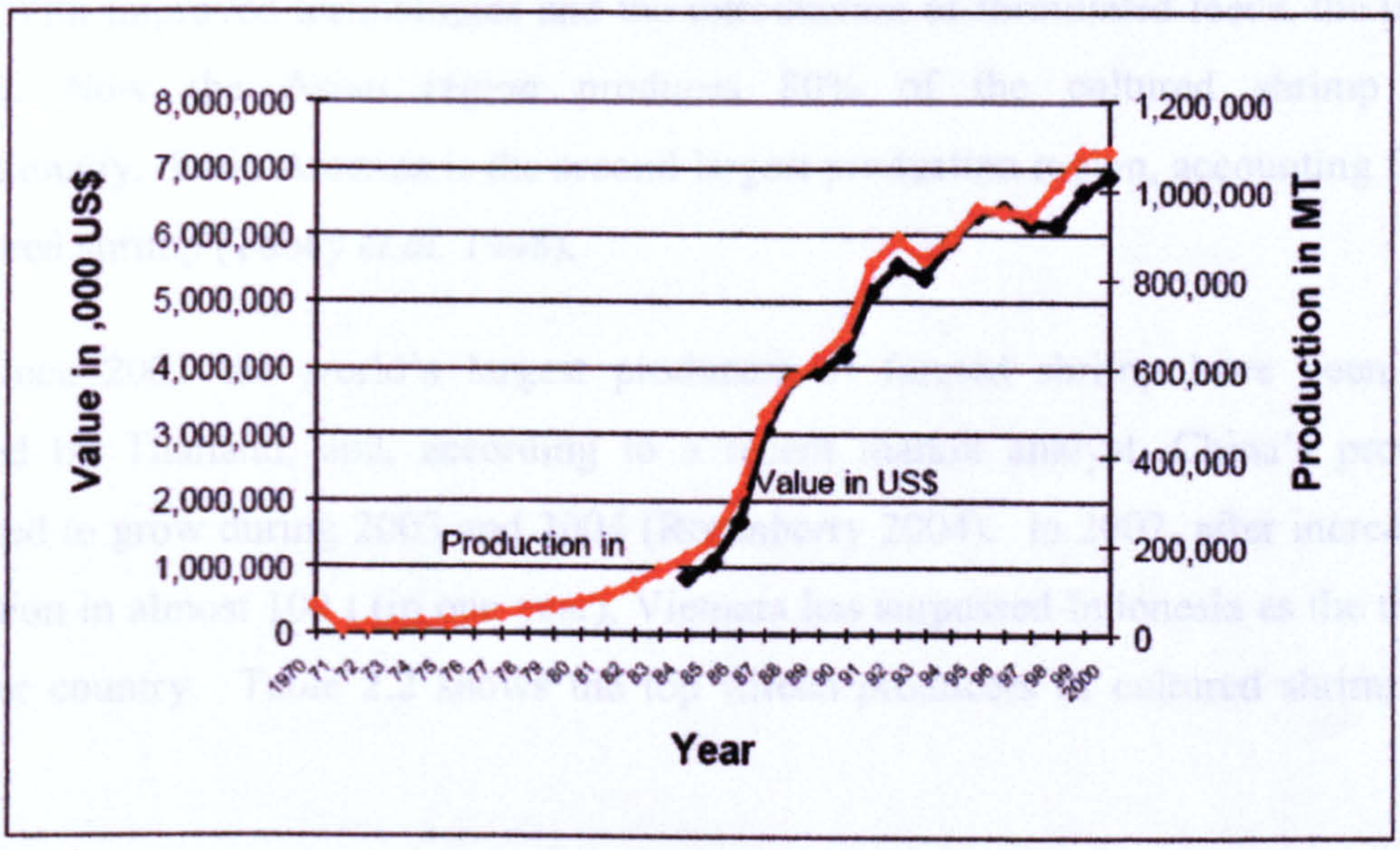

Figure 2.1 Growth of shrimp farming industry 1970-2000. Source: (World-Bank *et al.* 2002)

Table 2.1 Shrimp farming worldwide growth rate between 1970-2002

Years	**Average percent rate**[5]
1970-1980	23.9
1980-1990	24.1
1990-2000	9.9
2000-2002	11.0

Source: (FAO 2004)

This extraordinary growth has been driven by several factors. They include, rapidly growing demand, more producers entering the industry because of the high profit margins and promotion of the shrimp industry by major development institutions.

2.2.1 Who is producing the shrimp?

Virtually all of the world's farmed shrimp is produced in the global south, for example in 2002, 1,124,188 t or 99.4% of total production was cultured in developing countries (Delgado *et al.* 2003). In Asia, shrimps have for centuries been grown in traditional systems with low productivity aimed for domestic markets. Export-orientated shrimp aquaculture is a fairly recent industry that took off in the mid 1970s (Rönnbäck

[5] APR = average percent rate: average annual compounded growth rate in percent

2001). With improved technologies and the introduction of formulated feeds, the industry boomed. Now the Asian region produces 80% of the cultured shrimp traded internationally. Latin America is the second largest production region, accounting for 20% of cultured shrimp (Tobey *et al.* 1998).

Since 2001 the world's largest producers of farmed shrimp have been China, followed by Thailand, and, according to a recent market analyst, China's production continued to grow during 2003 and 2004 (Rosenberry 2004). In 2002, after increasing its production in almost 100 t (in one year), Vietnam has surpassed Indonesia as the third top producer country. Table 2.2 shows the top fifteen producers of cultured shrimp in the world.

From 1993 to 2000, Thailand was the world's largest producer of cultured shrimps, yielding between 235.000 to 299.000 tons annually (FAO 2002), with around 20.000 shrimp farms which cover an area of 80.000 ha (Holmström *et al.* 2003). Thailand remains the largest cultured shrimp exporter, as China only exports half of their production.

2.2.1.1 The shrimp farming industry in Latin America

As in many other countries, the development of aquaculture in Latin America took off during the seventies, since then aquaculture has grown strongly in the region, by 2000 the region was producing 817,874 tons with a value of US$2.98 thousand million (FAO 2003a). A specific characteristic of aquaculture in the region is that it is mainly export orientated, concentrating on two main products, salmonids and shrimps. Salmon farming has been concentrated almost exclusively in Chile, whilst Ecuador has been the centre of shrimp farming development (Hernàndez-Rodrìguez *et al.* 2001, Gilbert 2002).

From the beginning, with few exceptions, shrimp culture in the region has been an industrial-scale activity. It started in 1969 in Ecuador, with Colombia, Brazil, Honduras, Panama and Peru beginning production in 1982 (Martinez& Pedini 1998), by 2000 the region possessed over 240,000 ha of constructed shrimp ponds.[6] By contrast with Asia there was no tradition for growing shrimps in the region. Until the 1970s warm water shrimps were only caught by semi-industrial boats in the pacific coast of Colombia, Ecuador and north of Peru.

[6] Which represented 28% of the estimated global pond surface (869,470 ha).

Table 2.2 The top 15 producers of cultured shrimp by 2002

Rank	Country/Territory	Production (t)
1	China	310.7
2	Thailand	240
3	Vietnam	178
4	Indonesia	150
5	India	103
6	Bangladesh	63
7	Brazil	60
8	Ecuador	57
9	Mexico	46
10	Philippines	42
11	Malaysia	29
12	Venezuela	17
13	Colombia	12
14	Honduras	11
15	Taiwan PC	9.3

Source: Data from GLOBEFISH (2005) adapted by author.

The most popular shrimp production systems in the region are extensive and semi-intensive[7] ponds. Ecuador and Mexico have 40% and 30% of extensive farms; intensive systems are the least common, with Mexico, Peru and Venezuela having only 5% of intensive farms. All shrimp farms in Colombia are semi-intensive. Extensive systems have very low productivity despite the large surface area of ponds, compared with semi-intensive and intensive systems where productivity is much higher. With smaller surface area of ponds, for example extensive farms in Mexico, produce 708 kg/ha/year while semi-intensive farms in Colombia produce 3,750 kg/ha/year.

Ecuador has one of the lowest productivities (output/surface of farms) in the region and the world. In table 2.3, I have calculated a basic productivity rate using the production outputs and the surface area of shrimp ponds by some of the world's top shrimp

[7] Shrimp farming intensity refers to the level of inputs and associated output per pond area. Semi-intensive operations rely on moderate to high levels of post-larval seed, pumped water intake and supplementary feeds and chemicals (Stanley 2003). Extensive systems depend on tidal flooding of low-lying areas, with some additional pumping and occasional feeding (Maybin& Bundell 1996).

producers[8]. While Indonesia and Ecuador have the largest surface area of built shrimp farms (around 200,000 ha.), their output production is very low in terms of weight compared to Thailand and Colombia which have the highest productivity rate.

Table 2.3 Productivity of shrimp farms

Country	Area (ha)	Production (tons)	Productivity rate (t/ha/yr)
Thailand	70.000	210.000	3,00
Ecuador	208.000	63.375	0,30
Indonesia	200.000	50.000	0,25
India	140.000	70.000	0,50
Colombia	3.200	12.000	3,73

Source: INFOFISH (2005), and National Aquaculture Chamber (CNA 2005a)

Low productivity rates can be explained by the high proportion of abandoned ponds. Certain countries with vast coastal 'wastelands' and weak regulations which allows the easy conversion of coastal lands into shrimp ponds, have developed a shrimp farming industry that constructs ponds cheaply[9] and quickly. When the ponds are unproductive, after two or three years, they move to pristine areas; resulting in a high percentage of abandoned shrimp farms, and the 'get rich quick' and nomadic characteristics of the industry. What is interesting, is, that the annual worldwide productivity of the shrimp farming industry is 500 kg/ha/yr, an output below the minimum production potential of extensive farms[10] (Kaustky *et al.* 2000), even though at least 45% of shrimp farms worldwide are either semi-intensive or intensive.

2.2.1.2 Future trends

Latin America is still seen as a 'virgin territory' for the development of shrimp farming industry. According to some analysts, the region has a wide variety of ecosystems with great potential for developing shrimp aquaculture. Some studies suggest that currently only 16% of the suitable sites for growing shrimp are actually used (Gilbert 2002). Other studies estimate, that by 2020, the region will more than double its output from aquaculture

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[8] This productivity rate differs from the industry calculated rate, I used reported ha of built ponds, the industry uses ha in production (for an example see Tacon, 2002:13), this hides the fact that many of the countries have a very large percentage of abandoned ponds.

[9] Because they rely on very cheap, sometimes free land and naturally occurring seed and feeds.

[10] Potential productivity of shrimp farming systems: Extensive 600-1500 kg/ha/yr, semi-extensive 2000-6000 kg/ha/yr, intensive 7000-15000 kg/ha/yr (Kaustky *et al.* 2000).

and will become the world's largest net exporter of seafood products (Delgado *et al.* 2003). In Ecuador the industry still believes there are another 175,000 ha to be developed into shrimp farms (CNA 1998). A recent report by the World Bank considered Nicaragua to be the Central American country with the greatest potential for shrimp farming development (Cato *et al.* 2004). Others see the coastal waters of Mexico and Brazil as the largest and most promising ecosystems to develop (Agüero& Gonzàlez 1997). The potential, they argue, is huge, although not yet fully quantified.

Such perceptions have led to massive investment in shrimp farming in countries like Venezuela, Belize, Mexico and Brazil. In Mexico, production has increased from 35 tons in 1985 to 48,014 in 2001 since the introduction of the white leg shrimp (*Penaeus vanammei*). In Brazil aquaculture production was almost non-existent until the 1980s, when it increased from 10,700 t in1984 to 246,183 in 2002. Between 2002 and 2003 there was an increase of 33% in the number of shrimp farms, now production has grown by 50% between 2002 and 2004[11].

Investment in the Latin American shrimp farming industry will continue as governments see the industry as a genuine mechanism for diversifying the economy, generating employment in economically depressed areas and as an important source of earning hard foreign currency. Additionally, international finance institutions continue to promote the industry in the region, as will be illustrated below, because they see it as a key tool in poverty eradication (World-Bank *et al.* 2002:1).

2.2.2 Food for the poor?

Aquaculture in general and shrimp farming in particular have been presented as having the potential to enhance local food security, alleviate poverty and to improve rural livelihoods. For example, the Bangkok Declaration and strategy[12], emphasizes the need for the aquaculture sector to continue developing towards its full potential, to make a net contribution to global food availability, domestic food security, economic growth, trade and improved living standards (NACA/FAO 2000). They further added, that the practice of aquaculture should be pursued as an integral component of development, contributing

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[11] Data for this paragraph was obtained from FAO Fisheries global information system (FIGIS 2005). Information on specific countries was found using the National Aquaculture Sector Overview (NASO).

[12] The declaration was adopted by the conference Aquaculture in the Third Millennium, organised by the NACA and FAO and hosted by the government of Thailand. There were 540 participants from 66 countries and more than 200 governmental and non-governmental organizations participated.

towards sustainable livelihoods for poor sectors of the community, promoting human development and enhancing social well-being (page 5). Aquaculture is also presented as a very good alternative for reducing the over-exploitation of natural resources, as stressed in the shrimp and the environment report produced by the WB/FAO/NACA (World-Bank *et al.* 2002).

The question remains however, does shrimp farming actually contribute to enhancing food security in the countries where it is developed? Researchers and activists opposed to the shrimp farming industry claim, that in terms of protein intake, shrimp farming is not contributing to increased food availability in producing countries. Although more than 99% of shrimps are farmed in the developing world (as analysed in the above section), cultured shrimps are normally exported to developed countries, as illustrated by the final destination of cultured shrimp produced in Ecuador between 2000 and 2004 (table 2.4).

Table 2.4 Percentage of culture shrimp exported from Ecuador 2002-2004, showing total percent exported and percentages to each destination

Year	USA	European Union	Others	Total
2002	61	29	10	100
2003	63	31	6	100
2004	34	62	4	100

Source: Statistics from Ecuador's National Aquaculture Chamber (CNA 2005a)

This data is no different from that of other producing countries. In Thailand for example 95% of farmed shrimp is exported (Primavera 1997); the only exception is China which exports only half of what it produces, retaining the rest for domestic markets (Public-Citizen 2005b). Despite the fast-growing contribution of aquaculture to production, marine shrimp is still a high-priced commodity with its consumption mostly concentrated in affluent economies; the major markets for cultured shrimp are the USA, Japan and the European Union. USA is the leading market consuming 40% of the world shrimp production (see table 2.5).

Table 2.5 Major shrimp importing markets (2003)

Country /region	Consumption (million kg)	% of world consumption
U.S.A	364	40
Japan	318	35
Europe	182	20
Other	45	5

Source: GLOBEFISH country statistics (GLOBEFISH 2005).

Marine shrimp, once considered a luxury product in developed countries, has become more affordable, with shrimp cheaper today than 20 years ago.[13] Marine shrimp in the industrialised markets is now seen as abundant, protein-rich, tasty and readily adaptable to the full range of the world's cuisine, so its demand has increased wildly. Worldwide shrimp consumption has been on the rise for more that a decade (FAO 2000) and shows no sign of slowing in the major markets. Table 2.6 illustrates shrimp imports in the major markets and its percentage of change between 2002 and 2003.

Table 2.6 Shrimp imports (in tonnes) from major markets and its percentage of change (2002-2003)

Country	2002	2003	% change
USA	385700	459500	+ 19
JAPAN	226500	210400	-7
SPAIN	99100	109500	+ 10
FRANCE	63300	79100	+19
ITALY	40500	43600	+8
UK	86600	90300	+4

Source: GLOBEFISH country statistics (GLOBEFISH 2005).

According to this data the percentage of change is positive in almost all cases, with the USA showing the major increase; the USA national marine fisheries services (NMFS) reports that shrimp consumption per capita has increased steadily from 2.5 pound per person in 1995 to a record 3.7 (pound per person) in 2002, surpassing for the first time the

[13] For example in 1986 a pound of shrimps cost 14 dollars (de la Torre& Batker 1999), in 2002 the average price for the largest class of frozen shrimp (under 12 shrimp per kilo) was $5.92, with the smallest class at $2 (Harvey 2003)

consumption of canned tuna (Harvey 2003, CITAC 2004). Japan is the only market showing a negative change, this is due to an overall uncertainty about the national economy (FAO 2003c). In the other markets, the trend towards increase showed no change between 2003 and 2004. The latest market report for the European Union showed that key European markets imported record volumes of shrimp during 2004, with countries like Germany increasing consumption by 11% (O'Sullivan 2005).

A very important aspect of this growth is the increasing import of farmed shrimps from South America. Countries such as Spain and France have increased their imports of cultured shrimp from Brazil and in Italy cultured shrimp imports from Ecuador have increased by over 50%. The shift in consumption from wild shrimp to farmed shrimp is being driven by the price difference. In Spain for example a kilogram of wild shrimp was 8.03 euros per kilo, compared with 4.32 euros per kilo for Ecuadorian cultured shrimp (O'Sullivan 2005).

The World Bank estimates that there are now approximately 1 billion consumers who purchase shrimp produced by aquaculture. By the time the shrimp is actually purchased at the consumer level, the total value may be as high as $50-$60 billion (World-Bank *et al.* 2002). Shrimp consumption seems to be income-dependent rather than price dependent, at least in the US. This means, that consumption tends to depend on the overall level of income of the consumer, and the general health of the economy, rather than the price per se.

Demand for shrimp is expected to increase in the medium to long term, especially in the major import markets (USA, EU). In the UK the largest market share is for cold water shrimp[14], however in recent years imports of warm water shrimps have grown, reaching 25% of shrimp imports in 2004 (O'Sullivan 2004). India is the leading supplier of cultured shrimp with Bangladesh and Indonesia in second and third places. According to the UK latest shrimp market report, imports from Latin America have increased greatly in the last two years (see table 2.7).

[14] The UK is the largest market for cooked and peeled cold water shrimp in the world, consuming some 32,000 tonnes at year (O'Sullivan 2004)

Table 2.7 UK shrimp imports (in tonnes) from Latin America and its percentage of change

Country	**2003**	**2004**	**% of change**
Ecuador	347	1093	+215
Honduras	369	439	+ 19

Source: GLOBEFISH country statistics (GLOBEFISH 2005).

Demand for cultured shrimp is expected to grow worldwide, especially in Asian markets, demand in countries such as China, the Republic of Korea, Thailand and Malaysia will expand as local economies grow and consumers demand more seafood. This trend is already reducing the availability of shrimp for traditional importers, putting prices up (FAO 2002). Increases in prices will encourage new entries into shrimp farming, driving the expansion of the industry even further.

2.2.3 International finance institutions and shrimp farming development

The rapid development and expansion of the shrimp farming industry in developing countries has been to great extent fostered by assistance of the international finance institutions. Activists accuse the International Development Banks (IDB) especially the World Bank, for its active role in the industry's development; they claim the World Bank has being the biggest promoter and founder of the industry (Shiva 1994, Maybin& Bundell 1996, Hernàndez *et al.* 2002, Public-Citizen 2005a). This claim is denied by the World Bank. Bank officials claim, instead, that the World Bank group has only loaned US$300 million between 1985-2000, an amount that they said represents a very small percentage of the Bank's portfolio (Zweig 2000).

In the following sub-sections I attempt to show the importance of the International Finance Institutions (IFI) in the development and expansion of the shrimp farming industry. I believe that the role of the IFIs should not only be measured in loans and direct financial aid. I argue that IFIs role extends wider than monetary assistance. Macroeconomic policies, imposed on developing countries by the International Monetary Fund (IMF), using the Structural Adjustment Programs (SAP) have played a decisive role in the development of the industry. Another factor, which is normally overlooked, but in my opinion, has shaped the way the industry has developed, is the aquaculture research funded by IFIs.

2.2.3.1 Macroeconomic policies and shrimp farming

Development and expansion of the shrimp farming industry has been supported by the macroeconomic policies imposed on debt stricken developing countries by the IMF. Structural adjustment programs were linked with the imposition of neo-liberal policies, with emphasis on export- oriented productions, trade liberalisation, financial de-regulation, tax reforms and privatisation regimes. Under neo-liberal reforms, specific schemes and agencies were created to stimulate the growth of non-traditional exports such as farmed shrimps.

In a report on trade liberalization the World Bank provides us with an excellent example of how SAPs can be credited for the rise of shrimp farming in Bangladesh:

> *".....credit for this rise goes to a structural adjustment program in which Bangladesh received a World Bank loan of $1.76 billion over the period 1979–96. Under the program, policies that had limited trade were replaced with new policies that encouraged exports. The changes created an environment in which private investments in shrimp culture, shrimp processing, and shrimp exports flourished"* (Roheim 2004:3).

Also, devaluation regimes created opportunities to earn large profits in the export sector, for example in the 1994/95 Mexican devaluation shrimp exports rose 43,2% in value (Aguilar-Ibarra *et al.* 2000). Tax reforms, such as zero-rated VAT for export production, favoured the development and expansion of export orientated crops at the expense of domestic consumers. Credit support under new financial de-regulation regimes made possible the involvement of private enterprises and foreign investors.

Shrimp farming has the additional attraction of being a high-value commodity at a time when many Third World countries have been badly squeezed by the international debt crisis. The burden of debt and the tough free-market reforms insisted upon by the IMF and the World Bank as a condition for further loans, have forced debtor countries into aggressive export-orientated production. Governments need to generate foreign exchange to keep their heads above water, and this may have become one of the dominant reasons for the promotion of shrimp farming.

Neo-liberal policies produced a rise in the rate of return of culture shrimp increasing the scope for private involvement in the sector. Looking at the shrimp farming growth path, it is quite obvious that its growth has been most pronounced in the period coinciding with the adoption of neo-liberal policies in developing countries. Undoubtedly, neo-liberal policies have fuelled the expansion of the shrimp farming industry.

2.2.3.2 Sources of development assistance

Development assistance loans and direct aid for aquaculture expansion came from three sources: international development banks, bilateral aid agencies and multilateral development assistance agencies. Table 2.8 gives some examples of the different lending and aid institutions and their role in the development and expansion of aquaculture and shrimp farming.

Table 2.8 International Finance Institutions and their role in the expansion of aquaculture

Type of Institution	**Examples**	**Role**
International Development Banks (IDBs)	World Bank (WB), International Monetary Fund (IMF), International Finance Corporation (IFC), International Bank for Reconstruction and Development (IBRD), Inter-American Development Bank (IADB)	Provide loans, policy advice, technical assistance, promote private sector investment, grants to developing countries
Bilateral Aid Agencies (BIA)	US Agency of International Development (USAID), Canadian International Development Agency (CIDA), Norwegian Agency of Development and Cooperation (NORAD), Commission of the European Community (CEC)	Provide assistance to developing countries for economy growth, policy advice, finance projects and research
Multilateral Development Assistance Agencies (MDAA)	United Nations Development Program (UNDP), United Nations Food and Agriculture Organization (UN FAO)	Helps developing countries attract and use aid effectively, policy advice, modernization of practices through policy and research

Source: adapted from Public Citizen (2005a).

2.2.3.3 Aid, loans and shrimp farming

It will be very difficult to quantify the real amount of international aid and loans which have gone into aquaculture development and expansion over the years. This has become one of the battle grounds between environmental activists and the IFIs. There are claim and counter claims about the role play by the IDB in the development and expansion of export-oriented aquaculture. However, it is possible to recognise a change in the attitude of the IFIs concerning the quantity and type of information released on aid, and loans supporting aquaculture and shrimp farming development. During the second half of the 1980s FAO fisheries department created and maintained an information system called FIPIS (Fisheries Project Information System). The system included information on loans and grants for fisheries (including aquaculture) projects funded by the major donor agencies, however, the FIPIS database ceased to be updated in 1995.[15] Also, the section on external assistance to aquaculture in the Review of the State of World Fisheries report has disappeared since 1997. Another fact is that the World Bank has not released any substantial information on its credit policy concerning shrimp aquaculture since the beginning of the 1990s.

Despite its limitations, FIPIS is the best attempt yet at recording support to the aquaculture sector and provides very useful information about the role of IFIs in the expansion of aquaculture during the 1970s and 1980s. FIPIS most authoritative analysis were done by FAO (see: Josupeit 1985, Insull& Orzeszko 1991). According to the first report, between 1978 and 1984, bilateral aid agencies provided nearly half of the development assistance for aquaculture; the regional development banks (IADB, Asian DB, and African DB) provided a third and the World Bank less than 15%. This proportion changed during the 1985-1989 period, when the World Bank increased its share, during which it calculated that external assistance averaged 500 million US dollars a year (Insull& Orzeszko 1991).

According to FIPIS, development banks were consistently the main source of external funding for aquaculture between 1988-1993, providing 72% of funding, nearly US$660 million (FAO 1995). What is interesting, is, that according to Shehadeh and

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[15] The database has been taken over by the International Fisheries and Aquatic Research (SIFAR), the unit is trying to regenerate FIPIS, but still is not been updated (SIFAR 2005).

Orzeszko (1997), FIPIS data between 1994-1995 showed an increasing dominance of funding by the development banks. In 1994, the banks and bilateral agencies accounted for 91% of funding (74% and 17%, respectively). This information contrasts with World Bank statement, mentioned earlier (page 13), that only US$300 million have gone into shrimp farming industry.

The history of shrimp farming development and expansion in almost all top producer countries can be traced to a big aquaculture grant or loan made by the IFIs. For example Panama received 13.2 million dollars in 1983 from the Inter-American Development Bank to develop 1,500 ha of shrimp farms, this kick started the industry in the country[16]. The development of shrimp farming in Philippines can be traced to a 23.6 million dollar loan from the International Bank for Reconstruction and Development in the 1950s, then during the eighties, the Asian Development Bank made available 21.8 million dollars for shrimp hatcheries and ponds (Primavera 2000). Bangladesh has been receiving money from the Asian Development Bank and the World Bank for aquaculture development since 1977[17]. During the 1980s Indonesia received more than 50 million dollars from the World Bank, the Asian Development Bank and bilateral agencies to intensify shrimp production (Muluk& Bailey 1996).

Even though it has been argued that the development of the shrimp farming industry in Latin America has mainly been financed by private investors (Loria& Martìnez-Espinoza 1990, Hernàndez *et al.* 2002), IFIs have in fact played a very active role in its development. This point can be illustrated by an analysis of the FIPIS database, table 2.9 shows data extracted from FIPIS on April, 2005.

The table shows some examples of aid and loans given for the development of the shrimp farming industry in Latin America. Information on this table refers only to money given specifically for shrimp farming projects, there have been other loans and grants for aquaculture since 1977 but they have not been included in this table as it is not easy to identify how much of the loan went into shrimp farming.

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[16] Information from FIPIS database (FIPIS 2005).
[17] 18 million dollar in 1977 (Asian Development Bank), 300 thousand in 1981 (WB), 25 million dollars in 1986 (WB and UNDP), 36 million dollars in 1988 (Asian Development Bank), information retrieve from FIPIS database (FIPIS 2005).

For example, Mexico has received 125 million dollars from the World Bank group between 1995-2003 for aquaculture development. How much of this loan went into shrimp farming is impossible to calculate. In Brazil the same happened with three consecutive rural development projects, approved by the World Bank under the agri-business sector. More than 160 million dollars were loaned, all of these projects had an aquaculture component (see Moles& Bunge 2002), but as in the case of Mexico is it impossible to find the shrimp farming share.

Table 2.9 Loans and grants for shrimp farming development to Latin American and Caribbean countries

Project name	**Country**	**Amount US$ (million)**	**Financial Institution**	**Date**
Inter Sea Farms	Venezuela	10	IFC	2000
Rosario/ERSA	Ecuador	8	IFC	2000
Grupo Granjas Marinas	Honduras	9	IFC	1999
Nova Companies	Belize	6	IFC	1998
Camarones del Pacifico	Nicaragua	4.5	Commonwealth Development Corporation	1993
Shrimp Culture in Sinaloa	Mexico	4.5	IADB	1985
Agro-business	Brazil	22	IADB	1983-1988
Shrimp farming development	Panama	13.2	IADB	1983-1986
Shrimp farming venture	Costa Rica	2.1	WB	1979-1984

Source: Data from FIPIS database (FIPIS 2005).

As mentioned earlier, the real extent of the IFIs monetary involvement in the development and expansion of the shrimp farming industry in Latin America and the world is very difficult to assess. In addition, to direct lending to aquaculture, development assistance can be distributed in ways that do not directly reflect where the money ends up or what it was used for. This is particularly noticeable in the case of indirect loans to

intermediary entities and infrastructure loans. For example, rural development loans are given by the development banks to national intermediary banks, these can then be passed to shrimp farmers, but will not be reflect in FIPIS or in the IFC, WB databases.

2.2.3.4 The role of aquaculture research

Another aspect that is normally overlooked, and in my opinion, has been decisive in the development and expansion of the shrimp farming industry as we know it today, is the role play by aquaculture research funded by the IFIs. My argument is that IFIs have in the past and currently target specific research initiatives that not only promote the development and expansion of shrimp farming in developing countries, but have also allowed the industry's environmental and social impacts to go un-detected and unchallenged. They have also ignored and marginalised research into other aquaculture initiatives which could benefit the local communities.

A very good example of the way neo-liberal agendas and research develop hand by hand is the SIFR (study of international fishery research needs in developing countries). The aim of the study was to find the research constraints for the development of the aquaculture industry in developing countries and to draw up an action plan for targeted research donor support (SIFAR 1999); SIFR was financed by the WB, UNDP, CCE and FAO with support from DANIDA, ICOD, SIDA, ODA, USAID, GTZ.

Looking at the SIFR recommendations I found that the optimization of aquaculture systems to increase production, improvement of hatchery technology and increase research in genetic selection of cultured species are among them. These recommendations I would argue, are targeted specifically to export-orientated aquaculture. There is no mention of more local orientated systems such as herbivores fish and/or shellfish culture and cage or pens aquaculture. Systems which are less capital intensive, but are more efficient in producing protein to meet the local population's requirements which could be more sustainable in the long run.

Examining the research financed by multilateral and bilateral agencies such as CIDA, USAID, FAO, UNDP we can argue that research in aquaculture has been narrowly focused on export orientated aquaculture. For example, a quick review of the FAO corporate document repository for publications on aquaculture research (in the year 1991) shows 13 different studies for shrimp aquaculture, ranging from UNDP/FAO-CUBA/MIP

for the development of shrimp culture in Cuba (1986-1990) to the use of a GIS system to develop shrimp culture in Zimbabwe.[18] These cases illustrate how the aquaculture research has been shaped by international agencies to promote or support the introduction of export oriented species.

In a similar vein, a study commissioned by the World Bank and FAO on research needs for tropical aquaculture, found that up until 1991 aquaculture research focused on technical solutions and was basically restricted to large scale operations. According to the findings there was no research done assessing the social impacts of aquaculture development. In general, research on aquaculture was carried out by biologists and zoologists, with social and economical elements normally not included (World-Bank *et al.* 1991).

Things have not been very different in Latin America, for example, in 1997 Agüero and Gonzalez[19] found that aquaculture research in Latin America and the Caribbean region was basically carried out to meet specific demands either of private investors or development agencies. The authors reviewed research done between 1974 and 1996 and found that during that time there was no evaluation of the impact of aquaculture development on local communities. They also found that research on aquaculture concentrated on a few species, notably salmon and shrimp. The studies on the socio-economic impacts of aquaculture were descriptive and based on assumptions of positive effects, for example, increases in export earnings are assumed to mean increased community welfare. The authors did not find any studies quantifying the environmental cost of aquaculture development:

> *"Most of the research in aquaculture economics in the LAC region dealing with environmental impacts and sustainability costs are related to the estimation of physical, biological and chemical impacts, and rarely to the determination of the economic value of these impacts. No studies quantifying the environmental costs of aquaculture development (valuing externalities) were found; thus, the environment has rarely been considered as an*

[18] Source FAO Repository Document (FAO 2005).
[19] The assessment was commissioned by FAO.

endogenous factor in determining the economic performance of aquaculture"(Agüero& Gonzàlez 1997:5).

According to the authors the majority of the economic studies only carried out simple cost-return analysis and gross estimation of foreign exchange, and all of them lacked real assessment and predictive capacity.

These findings are a clear illustration of the way aquaculture research has been conducted in support of a marketisation strategy. In general, the research carried out by multi and bilateral agencies answer questions about technical feasibility and economic profitability, other important aspects such as the social and economic effects of aquaculture development in local communities were not considered; as a result industrial aquaculture (such as shrimp farming) has been promoted, uncritically, based only on technical and economic aspects. Its long-term negative environmental and social implications have been largely neglected by those promoting the industry.

The international machinery, supported by narrowly focused research, convinced governments in developing countries that this was the best type of aquaculture; the real cost and impact of aquaculture have gone unnoticed and the industry has been, and is still, promoted without evaluating the real benefits for local communities. Additionally, because the real impacts of the industry have not been documented, no research was done to find mitigating alternatives or to look for alternative types of development.

Another important effect of this type of research has been the marginalization of research into more sustainable, local aquaculture systems that could improve food security for vulnerable groups in tropical coastal areas. This aspect has been recognised by FAO. In a memo they accepted that aquaculture, primarily meeting local food requirements, has received little support compared to commercial aquaculture, including shrimp farming (FAO, 1995 quoted in: Barraclough& Finger-Stich 1996).

The role of multi and bilateral agencies has been pivotal, not only in the development of industrial aquaculture, but also in its unchallenged expansion as well as in the marginalization of what could be better alternatives for food production. In this way these agencies have become an easy way to funnel international aid into the development and expansion of shrimp farming.

Although some analysts agree that resources, available for designing and implementing aquaculture development projects, are not more immune to the current "down-sizing" trends than are those of most other publicly funded development initiatives (Hinds& Bacon 2001), and that today, primarily private funds are fuelling the production and trade in shrimp. Nonetheless, it is accepted that, even though there is fierce criticism of IFIs involvement in shrimp farming due to the negative environmental and social impacts of the industry (see next section), the IDBs, the FAO and other UN agencies, as well as bilateral aid organizations, still remain deeply involved in the development and expansion of the industry[20]. The UNEP Global Programme of Action for the protection of the marine environment from land-based activities (GPA) recognises that there is still concern about IFIs role as promoters of industrial shrimp production. However, they believe these agencies have the potential to make a positive contribution to improve management of the industry, restoration of degraded lands, and protection of coastal communities and ecosystems (GPA 2005). Section 2.5.4 will examine some of the IFIs changes in the light of criticism to the shrimp farming industry.

2.3 Shrimp farming: environmental and social cost and benefits

The rapid development and expansion of shrimp farming went virtually un-challenged for a couple of decades, but in the last 15 years has been accompanied by increasingly controversial debates over its real cost and benefits. Rapid expansion in Asia and Latin America has been coupled with rising concerns over the environmental and social impacts of its development (as we outline below), and controversy associated with shrimp culture in shrimp producing and importing countries has been growing. There is considerable uncertainty about appropriate policy and management responses, not least because of the perception that shrimp culture generates substantial benefits in coastal regions and at national levels.

Public opinion is being influenced by increased publicity on high profile concerns over environmental and social impacts of shrimp culture development, food safety of shrimp products, and, more generally, over the long-term sustainability of shrimp farming (see Chamberlain& Rosenthal 1995, Reinertsen& Haaland 1995, Bardach 1997, Paez-Osuna 2001). Since 99% of shrimp farms are located in tropical areas, there has been

[20] In 2000 IFC invested in four shrimp aquaculture projects and they have more projects on the pipeline (IFC 2005). Similarly the World Bank has also recently invested in a big research shrimp farming techniques in Colombia and Ecuador (Gautier 2002).

special attention paid to the impacts of the industry on developing countries (Pullin 1993, Bagarinao& Flores 1994, Parks& Bonifaz 1994, FAO/NACA 1995a, Menasveta 1997, Nambiar& Singh 1997, Hein 2000, EJF 2003, Express 2003, Barbier& Cox 2004, BBC 2004, EJF 2004).

Initially the major issues raised in the shrimp farming debate were concerns over the ecological consequences of conversion of coastal ecosystems and the environmental impacts. Currently, the debate is also centred on the social consequences of the industry and issues such as food security, and human right violations are being discussed. As an integral part of the so called "blue revolution", shrimp farming has integrated coastal ecosystems into the global food production system, and, as in the earlier green revolution, there is mounting criticism over its social, economic and environmental consequences.

2.3.1 The environmental impact of shrimp farming

Shrimp aquaculture relies on the natural environment for land, water, feed and seed, as do many other activities in the coastal areas (such as capture fisheries and agriculture). The expansion of shrimp aquaculture inevitably generates competition with other users of these same resources, including peasant farmers, artisans, fishermen, conservationists, the tourist industry and some state agencies.

The shrimp farming production process has different types of environmental impacts that arise from the consumption of resources, such as, land, water, seed and feed and the subsequent release into the environment of waste products, chemical residues, parasites and feral animals (Beveridge *et al.* 1997, Kautsky *et al.* 2000). Effects may be direct, through release of toxic chemicals, the transfer of diseases and parasites to wild stock, and the introduction of exotic and genetic material into the environment, or indirect through loss of habitat and changes in food webs (Rönnbäck 2001).

The first and more obvious impacts occur during pond siting and construction, then during pond operation different impacts are identified. The most important environmental concern of shrimp farming is the siting of ponds on fragile ecosystems, such as mangroves. During pond operation the effects on ground and estuarine waters due to water use and effluent discharges, become very important.

2.3.1.1 Shrimp farms vs. mangroves

According to the World Resource Institute (WRI 1996) more than 50% of the world's mangroves have been removed. The FAO's latest assessment (FAO 2003b), found that by the end of 2000 the mangrove area, worldwide, had fallen below 15 million hectares, down from an estimated 19.8 million hectares in 1980. Today, mangroves are considered one of the world's most threatened ecosystems, although the rate of deforestation has slowed from 1.7 percent a year from 1980 to 1990 to 1.0 percent a year from 1990 to 2000 (FAO 2003b), mangrove deforestation still continues.

Causes of mangrove loss in the last few decades are fiercely debated, some authors believe that the biggest cause is population pressure[21] (Ong 1995, Macintosh& Ashton 2002); others argue that the most important factor in mangrove destruction and degradation in recent years has been the expansion of shrimp aquaculture (WRI 1996, Kongkeo 1997, Menasveta 1997). According to some reports, globally, shrimp farming may be responsible for up to 25% of mangrove clearance that has taken place since 1960 (Clay 1996). In regions, where shrimp farming has become important, it is estimated that up to 50% of the mangrove destruction is due to shrimp aquaculture (FAO/NACA 1995b). Mangrove deforestation, due to shrimp farming is especially evident in Thailand, Ecuador, India and Indonesia, table 2.10 shows the estimated loss of original mangrove area in some of the top shrimp farming producing countries.

Mangrove loss and its degradation has become one of the battle grounds between local communities, environmentalists and the defenders of the shrimp farming industry. Industry advocates argue that shrimp farming is not a threat to mangrove ecosystems and that it should not be blamed for mangrove decline, but as will be discussed in section 2.5.1 grassroots organizations, researchers and international NGOs are not convinced and blame the shrimp farming industry for heavy mangrove loss. Mangrove deforestation has been found to contribute to fisheries decline, degradation of clean water supplies, salinization of coastal soils, erosion and land subsidence (Ruitenbeek 1994, WRI 1996, Spalding *et al.* 1997, Barbier& Strand 1998). Sathirathai & Barbier (2001) report a welfare loss of $27,264 to $35,921 per ha in the Surat Thani province in Thailand due to the conversion of mangroves into shrimp farms. The extent of mangrove loss due to the shrimp farming industry in Ecuador will be discussed in section 2.6.

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[21] House building, tourism, mining, conversion to agriculture, developing of roads and ports

Table 2.10 Estimated loss of original mangrove area

Country	Loss of original (%)	Shrimp farming producing rank
Bangladesh	73	6
Ecuador	57	8
India	85	5
Indonesia	45	4
Thailand	87	2
Vietnam	62	3

Source: Mangrove loss country data (WRI 1996) and shrimp farming producing rank (GLOBEFISH 2005).

2.3.1.2 Water use and water pollution

The demand of shrimp aquaculture for large volumes of unpolluted water is central to farm operations. According to Gujja and Finger-Stich (1996) each metric ton of shrimp produced in intensive farms requires about 50 to 60 million litres of water. Water can be obtained by either pumping it from the ocean (very costly), from nearby rivers or estuaries, or from underground. Farms normally use a combination of these sources (Tobey *et al.* 1998).

Salinization of fresh-water sources and of soils is one of the most common problems associated with shrimp farming water use. Pumping fresh-water from ground aquifers into the ponds often lowers the water table, which in turn causes seawater to flow inland into fresh-water sources. The pollution of agricultural land is also caused by salinization from sea-water that has been pumped in and is often flushed out within terrestrial environments. The implications of salinization and falling ground water tables on surrounding populations and overall biomass productivity are among the most worrisome impacts of shrimp aquaculture. Salinization reduces water supplies not only for agriculture but also for drinking and other domestic needs.

Another important aspect is the water pollution caused by the industry. Shrimp aquaculture causes water pollution and is also affected by it. As explained above, great amounts of water are pumped into the ponds, and then water is discharged back into the surrounding estuaries and creeks. When water is discharged back it can contain three main types of contaminants: nutrients, drugs and antibiotics and chemicals. For every crop

cycle, each hectare of pond produces tons of nutrients in the form of undigested feed and faecal wastes. These nutrient contaminants result in hyper-nitrification and regional eutrophication[22] and will also accumulate in nearby sediments increasing bacterial populations and changing nutrient cycles. Nutrient effluent can stimulate algal blooms which kill fish and other marine life and also reduce water quality in the surrounding areas (Tobey *et al.* 1998). Additionally, ponds discharge ammonia, nitrites and nitrates. Ammonia is fatal to fish and other sea creatures (Ibrahim 1995), whilst nitrates on the other hand induce the growth of fungus, bacteria and viruses, that attack both shrimp and other marine organisms. In this way the farms produce self-pollution that has been responsible for the spread of shrimp diseases such as TSV and WSSV (see section 2.4.2.1). The effects of drugs and chemicals will be analysed in section 2.3.1.5.

2.3.1.3 Effect on biodiversity and surrounding fisheries

The impacts of shrimp aquaculture on biodiversity[23] are multiple. Shrimp ponds cover vast coastal land areas which pollute large volumes of water. Modified water circulation systems alter wild fish and crustacean habitats. Also, the introduction and transfer of alien species may lead to competition with endemic fauna and the introduction of pathogens and parasites. The risks of disease spreading out of the ponds into wild stocks are increasing as post-larvae and brood-stock are transferred from one continent to the other. Section 2.4.2.1 will show how shrimp epidemics are affecting not only farmed shrimp but have also extended to wild stocks.

In the areas where farms depend on the capture of wild seed (post-larvae), the high mortality provoked in the by-catch[24] species, can have a major consequences for biodiversity and capture fisheries production. For example, in India and Bangladesh where the collection of wild *Penaeus monodon* seed supports the shrimp farming industry, up to 1000 fish larvae and other shrimp fry are discharged for every penaid shrimp collected. Given that a yearly seed collection of one billion *P. monodon* in Southeast Bangladesh, the amount of by-catch destroyed is staggering (Primavera 1998).

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[22] The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates, which typically promote excessive growths of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish and shellfish.

[23] The totality of genes, species and ecosystems in a region.

[24] By-catch are the non-target species that are caught incidentally in the nets used to get post-larvae, in the case of wild collection of post-larvae the by-catch is comprise by fish and other shrimp larvae.

Pollution from shrimp farms contributes to the increasing frequency of "red tides" which endangers other native fauna and flora. The negative impacts of released cultured shrimp on the genetic diversity and resilience of indigenous shrimp are mostly unknown, but are believed, by some specialists, to be considerable (Pullin 1993, Ibrahim 1995).

In addition to the very visible and possibly irreversible degradation of coastal ecosystems, shrimp aquaculture may have unforeseen indirect impacts on biodiversity. For example, with the clearing and levelling of coastal areas, ecosystems and populations are becoming more vulnerable to flooding and tropical storms. The sedimentation of estuaries negatively affects coral reefs and remaining mangroves, in their roles as nursery beds for numerous fish species.

2.3.1.4 Use of fish meal and fish oil in shrimp diets

Whereas traditional and extensive shrimp aquaculture uses natural production in the ponds or in the incoming waters, semi-intensive and intensive production systems are heavily dependent on formulated feeds based on fish meal and fish oils. These latter systems use 2 times more protein, in the form of fishmeal, to feed the farmed shrimps than is ultimately harvested (Tacon 1996).

At present, the shrimp farming industry is totally dependent upon marine capture fisheries for sourcing its dietary animal protein and lipid inputs (Tacon 2002). Thereby, its feed requirements are placing a strain on wild fish stocks. Currently, about 1/3 of the total harvest of capture fisheries is used to produce fish-meal, one third of which is used by the aquaculture industry (Naylor *et al.* 2000). This may result in over-fishing of small pelagic species, affecting marine food chains, and ultimately marine mammals and top carnivores (Kautsky *et al.* 2000, Naylor *et al.* 2000). Four of the top five and eight of the top twenty capture species are used for reduction to fishmeal (FAO 1998). All are small pelagic fish, including anchovies, Chilean jack mackerel, Atlantic herring, chub Mackerel, Japanese anchovy, round sardine, Atlantic mackerel, and European anchovy.

2.3.1.5 Improper use of antibiotics, drugs and chemicals

Antibiotics and drugs are commonly used in shrimp farming to prevent or treat disease outbreaks. Their use may cause development of antibiotic resistance among pathogens infecting cultured animals and humans. The problem can be exacerbated by the improper use and abuse in many shrimp farming countries. Recent studies have found that

large number of antibiotics are used not only to treat diseases but also as prophylaxis (Holmström *et al.* 2003). Traces of antibiotics above European, Canadian and US permissible levels have been found in farmed shrimp since 1990 (Rönnbäck 2002), but the most publicised case has been the detection in 2001 of chloramphenicol[25] in farmed shrimp from China, Vietnam and Southeast Asia imported into the European Union. This find prompted a food safety scare and product recall (SNI 2005).

The scare highlighted the health risk for consumers in developed countries, pressing governments to impose bans and stricter sampling regimes. For example, the European Commission decided that every consignment of farmed shrimps from China, Vietnam and Indonesia must be analysed for antibiotic residues before import to the European Union (European-Commission 2001a, b). However, other important aspects such as the biological effects on the surrounding environment and the environmental fate of antibiotic residues and more importantly the potential antibiotic resistance among local farmers and inhabitants in the producing countries, have received little publicity and minimal research.

Antibiotics are not the only substances used in the shrimp farming industry. Other chemicals[26] including fertilizers, disinfectants, liming materials, feed additives and pesticides are used (Gräslund *et al.* 2003). A number of oxidants (chlorine, hydrogen peroxide and potassium permanganate) pose hazards for health of farmers and workers handling the products (ILO 2002). Other chemicals with occupational health hazard are formalin, pesticides and malachite green[27]. Concerns have also been expressed about local exposure to mercury, cadmium, organo-chlorinated pesticides and dioxins (Barg 1992:32). Excessive and indiscriminate use of chemicals result in problems related to toxicity in non-target species (cultured species, humans and wild fauna) with accumulation of residues in tissues and sediments. The use of substances is increasing due to the growing number of diseases and epidemics in the farms (see section 2.4.2.1). According to Rönnbäck (2001) the constraints in the safe and effective use of chemicals in the shrimp farming industry

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[25] Wide range antibiotic. Interferes with protein synthesis, depressing red blood cells and leading to aplastic anaemia. Not safe level yet identified for human exposure. Use in meat producing animals and aquaculture is banned in EU, Canada, and the US (FDA 2005).

[26] Gräslund, *et al.* (2003) identified more than 70 different substances or types of products used in the Thailand shrimp farming industry. Among them: soil and water treatments, fertilisers, pesticides (some of them classified by WHO as extremely hazardous to human health), disinfectants, immunostimulants, vitamins and feed additives.

[27] This chemical is suspected of causing cancer and has been banned in the UK aquaculture industry since 2002 (DARNI 2005).

include misapplication of some chemicals, insufficient understanding of mode of action and efficacy under tropical conditions together with uncertainties with regards to legal and institutional frameworks for shrimp farming chemicals use.

While all these impacts are direct and can be easily recognized there are other less obvious impacts, one of the most important is the hydrological changes produced. This can bring salinity changes plus changes in the estuarine flow and local hydrology caused by isolation from brackish waters and normal tidal inundation from construction of ponds, channels and access roads. Additionally, effluent discharges from the shrimp farms can increase the amount of sediment in the mangrove areas, produce eutrophication and release potential harmful chemical contaminants (Tobey *et al.* 1998).

These impacts can vary according to the size of the ponds, the location, the management of the ponds and the capacity of the receiving waters. For example, extensive and semi-extensive farming systems that rely on wild post-larvae can have a great impact on other aquatic animals through by-catch and the physical destruction of habitat, on the other hand, intensive systems need more external inputs such as energy, feed, chemicals, and water producing greater volumes of waste.

2.3.2 Social consequences of Shrimp farming

The impacts of shrimp aquaculture do not stop at the biophysical environment; they extend into the local coastal communities whose livelihoods depend upon the coastal natural resources. Their experiences show that shrimp aquaculture has very important, direct and indirect impacts on the lives of the people who live in areas where it is undertaken. As explained previously, shrimp farming consumes natural resources such as land, water, seed and feed. Its introduction in the coastal areas has generated conflicts over the control of these resources with other users. The following subsections describe some of the most important social impacts of the shrimp farming industry.

2.3.2.1 Food security

Global food security needs are used to justify the heavy promotion and subsidisation of aquaculture development by national and international lending agencies. This does not apply to cultured shrimp, which, as shown in section 2.2 is destined for luxury export markets. Rather, the development of shrimp ponds has a negative impact on food security in coastal areas for several reasons. Firstly, industrial shrimp farming is heavily depend on

formulated feed based on fish meal and fish oils (as discussed above), it uses twice more protein that is ultimately harvested, so shrimp farming is a rather inefficient way to produce calories[28]. In his latest review on shrimp farming feeds Tacon (2002) concludes that the shrimp farming sector is currently consuming more fishery resources than it is producing (by weight). In other words, the sector is currently a net consumer of aquatic products rather than a net producer. Therefore, we can argue that shrimp farming is a very expensive way of reducing fish protein.

Secondly, the increased demand for fish meal leads to the increase in market prices for fish and shellfish, leads to over-fishing and also leads to feeding shrimps with fish that were previously consumed by humans. In other words, shrimp farming is taking fish protein from the poor and converting it into luxury shrimp protein for the rich.

Thirdly, the destruction of mangroves and other coastal ecosystems leads to habitat loss for local fish populations and decreases the size of gathering grounds for other local fishery products such as clams and cockles. Also, the destruction of mangroves, the collection of shrimp seed and the pollution from shrimp farms lowers the fisheries catch in the surrounding areas. The limited access to fishing areas and gathering grounds in areas around the shrimp farms exacerbates the problems of local access to fish protein.

Decreases in agricultural production due to loss of agricultural lands, land subsidence, lowered ground water levels and salinization of soil and water are among other factors decreasing local food production in the areas where shrimp farming is practiced. In other cases (especially in Southeast Asia) the entry of shrimp as a commodity has caused some farmers to shift existing aquaculture traditional practices for domestic markets, to commercial aquaculture practices for export markets (Rönnbäck 2002).

2.3.2.2 Privatizing the commons

Shrimp aquaculture utilises common property resources, such as mangroves and water, whose use was once regulated communally. These common property resources contribute greatly to social equity, since net monetary benefits are distributed to large groups of politically and economically marginal people. However, the development of

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[28] From the total amount of food provided only 17% is converted into consumable flesh, 15% is leached or not consumed, 20% release in faeces, 48% is used for maintenance, moulded and metabolism (Barraclough& Finger-Stich 1996).

aquaculture ponds transforms mangroves into a single-use private resource, with the opportunity for redistribution of benefits becoming limited.

The loss and limited access to common pool resources such as mangrove areas, estuaries, and fishing grounds, is one of the most critical social problems identified by local communities as part of the expansion of industrial shrimp farming. As will be illustrated in chapter 5 for the REMACAM area, local people depend on these common resources for both subsistence and commercial economic activities.

All across Asia and Latin America, residential, agricultural and forest lands are being converted into shrimp farms (Primavera 1998). Even burial grounds have not been spared[29]. The loss of grazing land and other green vegetation has led to a decline in livestock in Sri Lanka (Alauddin& Tisdell 1996). In India, huge shrimp farm complexes also block access of villagers to fishing grounds and to beaches for landing their boats and drying their nets (Shiva& Karir 1997). Shrimp farms have taken over lagoon areas in Honduras, and fishermen can no longer fish in these rich fishing grounds (Dewalt *et al.* 1996). Building shrimp ponds in mangrove areas has transformed fisheries from a common property resource available to multiple users to a privatized farm resource.

2.3.2.3 Marginalization of local communities

The capital-intensive nature of shrimp culture has favoured the entry of multinational corporate investors, together with national and local elites. They can provide the necessary capital, have easier access to permits, credits, subsidies, and can absorb financial risks. In this context, local communities in coastal areas, also small farmers, are disadvantaged. Outsiders control of large shrimp farms is the primary cause of social imbalance and the deteriorating law and order in coastal areas in Bangladesh (Alauddin& Hamid 1996) and in many other coastal areas where industrial shrimp farming has developed.

The industrial nature of shrimp farming makes it a capital-intensive enterprise rather than a labour-intensive one. Employment of local people is often limited to low-paying, unskilled jobs such as processors, guards, and temporary labourers during harvesting and pond preparation. Processing is a low-paid and precarious employment done mostly by

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[29] In one of the REMACAM communities (La Tola) the construction of a shrimp farm flooded the community's cemetery.

women and quite often by children. In general, technical and managerial positions are reserved for outsiders (Rönnbäck 2002).

Activists accuse the industry of providing a very limited number of jobs. They argue that 1 ha of shrimp farming provides 0.1 employment while 1 ha. of mangrove produces enough resources to feed at least 10 families[30] (FUNDECOL 2000e, Greenpeace& Tròpico-Verde 2002). Their claims are backed by research reporting that the employment provided by the shrimp farming industry varies between 0.1 to 1.0 person per ha (Tobey *et al.* 1998). A very detailed study of job creation by the shrimp farming industry in Honduras, found that the industry creates only 0.5 full time jobs per year per ha. (Stanley 2003). However, this work is highly seasonal in nature[31] and data suggests that the direct employment creation potential of the semi-intensive shrimp farming is probably less than one-half job per hectare (page 201). It will be shown in chapter 7 that our research found that employment, provided by the shrimp farming industry in the REMACAM area, is smaller that 0.1 per ha. But as Vandana Shiva points out, the issue is not how many employees the industry creates, but how many livelihoods it destroys. A typical Indian paddy field employs 50 people, a shrimp farm occupying the same land employs five. She has estimated that for every shrimp farm created 15 shrimp harvesting jobs are created together with 50 security jobs. However, 50,000 people are displaced through the loss of their land and traditional fisheries (Shiva *et al.* 1991).

2.4 The real price of shrimps

In numerical terms, farmed shrimp appears to be a very successful non traditional export product in developing countries, generating much need it hard currency. However, the question remains is the industry really as good as it looks on paper? Does the industry generate a real economic surplus in the countries where it is practiced? Several authors argued that the industry does not really live up to its expectations, and if externalities are taken in account, the industry is causing more damage than the good it generates.

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[30] Research by Fundecol in Ecuador shows that a shrimp farm of up to 100 ha. generates a maximum of 5 employ: 1 administrator, 1 pump-worker, 1 cook, 2 guards; one hectare of mangroves on the other hand supports 10 families of an average 8-10 member (FUNDECOL 1999:5).

[31] Cruz-Torres (2000:83) found a similar pattern in Mexico: 'A small portion of the rural population has also benefited from employment, which has been limited mostly to seasonal, low- wage, temporary jobs as construction workers, as security guards, or as wage laborers in hatcheries'.

Damages such as mangrove destruction, salinization and pollution of soil and water are among of the so call externalities[32] of the shrimp farming industry. Externalities can be defined as the damages caused by the activity to the environment and to other user groups, but that the activity does not assume responsibility or pay for them. So they are not included in the production cost of shrimp. It can be argued that these externalities are another subsidy to the industry.

Some analysts argue that the industry is unreliable and feeds on nature, and government benefits and subsidies. This industry has also proven to be vulnerable to boom and bust cycles due to market changes and epidemic diseases. All of these aspects are seldom included in cost-benefit frameworks and as result they are not accurate. This produces a false scenario in terms of real cost and benefits for the producing countries and have promoted coastal resources exploitation through reduced production costs to the industry.

2.4.1 A highly subsidized industry

To encourage the development and expansion of the shrimp farming industry, local, national, regional and international agencies have provided economic incentives which include subsidies for production, inputs and outputs. The main arguments for this support have been: 1. the risky character of shrimp farming production for which knowledge is still rather limited; 2. the relatively high-tech content of some of the industry practices; and 3. the significant perceived potential of the industry to provide socio-economic development opportunities, especially in deprived regions and poor countries.

According to Bailly and Willmann (2001), the following are the most important types of incentives for shrimp farming development and expansion:

- subsidies to fixed capital or cooperating capital by direct grants, soft loans or debt-equity swaps;
- income and profit tax rebates (tax-holidays);
- public investment in collective infrastructure (e.g. water channels and bunds, electricity supply);
- market promotion of aquaculture products;

[32] An externality exists when an economic activity causes an impact on a third party which is not accounted for in the private decisions of producers and consumers.

- investment in human capital (skill development through training and extension) and public investment into innovation (research and development); and
- technology transfer.

Governments in producing countries are 'encouraged' to develop export oriented policies. For example, in the FAO's promotion framework for the introduction of shrimp farming in Africa, the authors Ridler and Hishamunda (2001), offer the African's, as a very good examples a list of incentives that other countries have used to encourage the shrimp farming industry (see table 2.11).

Table 2.11 Examples of incentives given to the shrimp farming industry

Country	**Type of incentive**	**Duration**
Costa Rica	Corporate tax exception	15 years
Honduras	Tax exemption for imported machineries, seed and feed	Permanent
Madagascar	Tax holiday	15 years
Puerto Rico	90% tax holiday	20 years
Sri Lanka	Tax holiday	5 years

Source: adapted from Ridler and Hishamunda (2001)

These incentives are not normally isolated, they are part of a wider incentive system, for example, in Costa Rica additional to corporate tax exception, shrimp farms have a special tax regime, which pays back to the companies 15% of their FOB[33] value. In Sri Lanka, after the 5 year tax holiday, tax will be discounted for another 15 years; also the industry is exempt from duty on inputs and turnover. Madagascar is a very interesting example, shrimp farms operate in an industrial free-trade zone, where the industry is exempt from import duties, and professional and excise taxes. Once the 15 year tax holiday is over, 10% will be levied.

If all of these incentives are taken into account, we can argue that the 'export earning' power of the industry will be somehow diminished. Remember, 50 to 60 % of shrimp farming costs are spent on feed. If feed is imported free of tax, the governments are not only losing revenues from non payment of corporate tax, but revenues from import

[33] "Free On Board": the value of the exported goods.

duties. Huitric *et al.* (2002) argues that subsidies are both economically costly and environmental harmful[34]. For example, Stanley (2003) reported that the Honduran government looses (in tax) between 1 to 1.5 million US$ per year due to the financial incentives to its shrimp farming industry. Section 2.6.3 will show how in Ecuador the industry not only gets incentives but direct financial help from the government.

2.4.2 Boom and bust cycles

Shrimp production is characterised by boom and bust cycles. The busts are caused by production crashing as a result, primarily, of pollution and disease outbreaks. In Asia, the average intensive farm has been found to survive only two to five years before serious pollution and disease problems cause early shrimp pond closures (Quarto *et al.* 1996). In many countries, the production has stagnated, and in others have even been reduced (Kaustky *et al.* 2000). The total world production of cultured shrimp is enhanced by new countries entering the industry.

The case of Taiwan provides an excellent illustration. Taiwan was known as the "Mecca of black tiger prawn aquaculture", by 1987 it was producing 80,000 tonnes of farmed shrimp. In 1988 the production dropped to less than 20,000 tonnes. The origin of the drop was a disease caused by *Monodon baculovirus* that affected between 40-80% of the farms on the island. A close examination of the Taiwan's crash showed that it was basically man-made. Self-pollution, over-stocking, and wide spread use of chemicals were among the main culprits (Kwei-Lin 1989).

Other spectacular crashes have been the Philippines (1989-1990), Indonesia (1991-1992), China (1993-1994) and Ecuador (1993-1996). For detailed information see Primavera, (1997) and Rönnbäck, (2001). Analysts and experts suggest that, the high return on investments in the early stage of shrimp farming development led to a rapid increase in the number of farms, obviously to a level beyond the carrying capacity of the environment in many countries. In most instances, the profit margin was such that any operation that lasted for at least 2 years was financially profitable, and the cost of establishing operations in other areas, if the old ones collapsed, was sufficiently low as not to be a deterrent (Kaustky *et al.* 2000).

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[34] Barbier and Cox (2004) show how shrimp farming subsidies in Thailand not only artificially inflated commercial profitability of the industry, but lead to more mangrove conversion in the country.

So, instead of investing in more sustainable management practices investors move from one place to another, then, when the country is saturated by abandoned and producing ponds, they move to another country. This has led to a very important characteristic of the industry (mentioned earlier) the 'nomadism' or as Vandana Shiva and others called it 'rape and run'. In this sense shrimp farming industry behaviour is similar to the tropical 'slash and burn' agriculture, with the difference being that shrimp farming abandoned areas are normally rendered useless or very expensive to rehabilitate.

2.4.2.1 Diseases, diseases, diseases

Infectious disease[35] is considered to be the most devastating problem in shrimp culture nowadays. Direct losses due to viruses in the last five years are estimated to be in the region of several billion US dollars (Subasinghe *et al.* 2001). However, during the past 25 years there have been enormous advances in the understanding of the nature of these diseases. These include, the development of sophisticated diagnostic tests and procedures, the characterization of pathogens at the genetic level, the development of a diverse range of chemotherapeutic agents and vaccines and powerful information technology capabilities with state-of-the-art risk analysis procedures (Humphrey 1999). Paradoxically, despite these unprecedented advances, major disease epidemics continue to occur globally in farmed and non-captive aquatic shrimps. The spread of the White Spot Syndrome Virus (WSSV) in the world and Latin America provides an excellent illustration of the problem (see fig. 2.2).

WSSV is considered one of the most detrimental and widely disseminated pathogens to farmed shrimps. It was first detected in Taiwan in 1992 and since then, spread rapidly to most Asian countries. It arrived in the western hemisphere in 1996, and has now spread to all shrimp farming countries in Latin America[36] and the Caribbean (FAO 2003a).

The rapid spread of infectious diseases such as WSSV and TSV have been ascribed to the irresponsible trans-boundary movement of seeds, brood-stock and juveniles.

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[35] The diseases of cultured shrimp include syndromes with infectious (viral, rickettsial, bacterial, fungal, protistan and metazoan etiologies); there are as well a number of non-infectious diseases that are important for the industry (Kaustky *et al.* 2000). Booyaratpalin reported at least 9 different types of viruses in the industry (1999)

[36] The disease has just been diagnosed in Venezuela and Brazil (OIE 2005a) Also, 30 farms in Sonora Mexico have WSSV (Panorama_Acuicola 2005b). Also in April this year, the Venezuelan government recognised that the TSV is affecting 90% of their shrimp farms (Panorama_Acuicola 2005a).

Although there are often legitimate reasons for international movement of species for aquaculture, many movements have been poorly considered, unnecessary and irresponsibly implemented (Subasinghe& Arthur 1999). The use of wild-caught seed[37] and the introduction of alien species are among other reasons for disease dissemination.

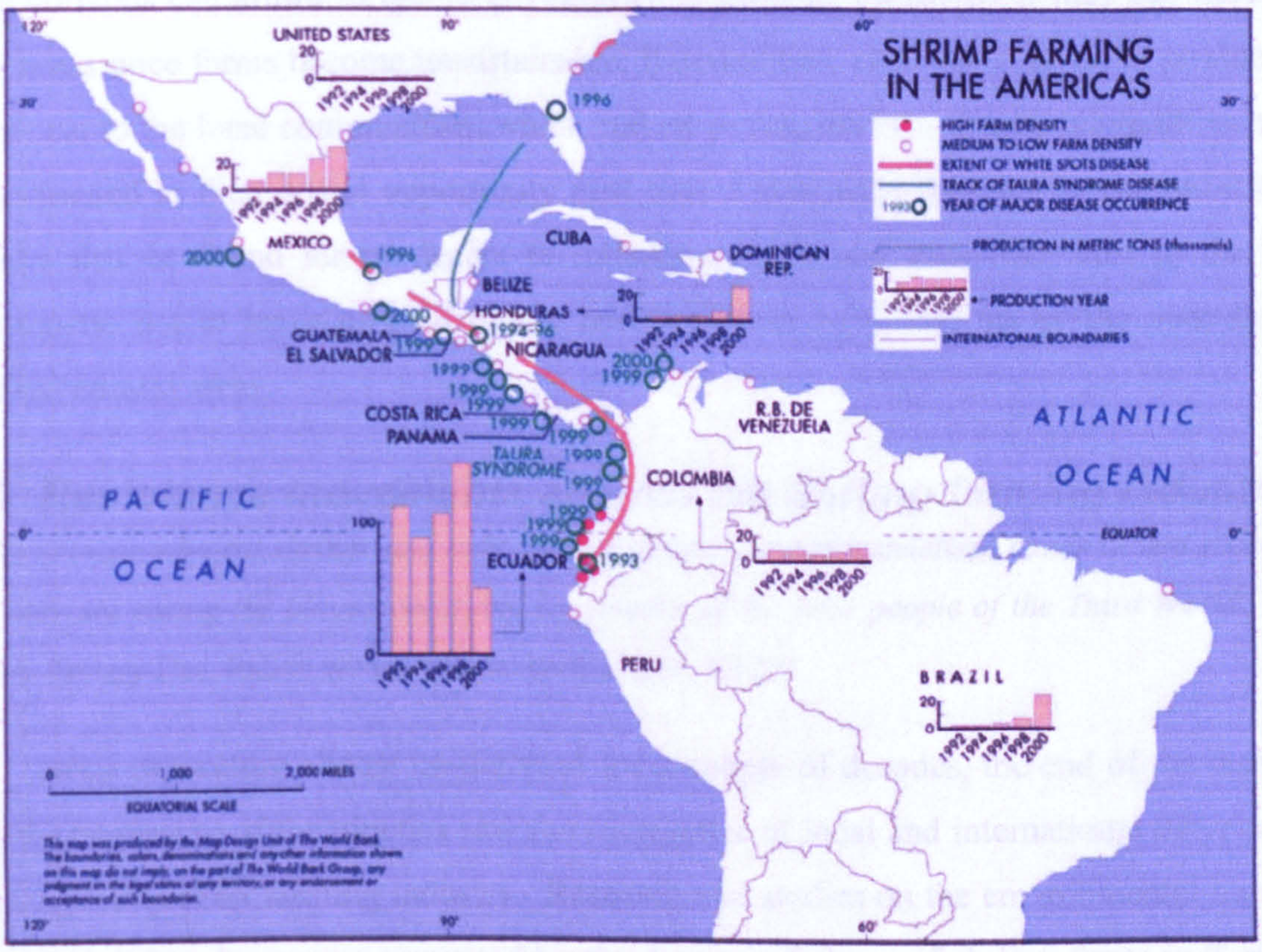

Figure 2.2 Important shrimp farming areas in the Americas and the extent of WSSV and TSV (Source: World-Bank *et al.* 2002).

A primary factor linked with disease outbreaks is poor water quality, which in turn is a result of bad management practices on shrimp farms and the complete disrespect the industry has for the environment. The spread of disease results in increased use of chemicals, depletion of natural stocks, and creates bad reputation for the industry. In one of the WB/NACA/WWF/FAO workshops on shrimp diseases one of FAO representatives warns the industry "*Pathogens are one of several issues that provide ammunition to anti-aquaculture groups in their attempts to discredit the industry and prevent its further expansion*" (Subasinghe& Arthur 1999:14). In my opinion, diseases not only provide

[37] Wild post-larvae are use due to the perception that they are better that hatchery reared ones; also they are cheaper to obtain, maximising the industry's profit margin.

ammunition, but show the complete inertia of the industry to change its production model and to move to better, more sustainable management practices.

This inertia is due to time-horizons. A long-run perspective would encourage environmental protection as a means of maximising income. However, investors with short time horizons can afford to ignore environmental damage, especially if they can move to new areas once farms become unsustainable. Externalities, although costless to producers, are a cost to the local communities, which end up paying the bill. These externalities must be evaluated at their social opportunity cost over a long-time horizon. Ways and means should also be found for producers to internalise them and pass their cost to the rich consumers, not to leave un-paid highly costly bills to be picked up by the poor in the tropical coastal areas.

2.5 Resistance movements against the Shrimp farming industry

'I say to those who eat shrimp and only the rich people from industrialised countries eat shrimp I say they are eating the blood, sweat and livelihoods of the poor people of the Third World'. Shri Banke Behary Das, Indian environmental campaigner, QEPD.

After expanding almost un-detected for a couple of decades, the end of the eighties and the beginning of the nineties saw the emergence of local and international movements resisting the shrimp farming industry. Research and studies on the environmental impacts of shrimp aquaculture were prompted by the dramatic failures of shrimp farms in Taiwan, Thailand, Indonesia and China and the massive mortalities in shrimp ponds in Ecuador due to a new disease, now known as Taura syndrome. Results of research and studies have started raising concerns about the sustainability of shrimp aquaculture, in particular intensive farming.

At the same time, local communities and national and international NGOs started asking questions about the social impacts of the industry. Pioneer work, such as that of anthropologists LiPuma and Meltzoff (1985) began questioning the social impacts of the shrimp industry in Ecuador. Bailey (1988) looked at the social consequences of tropical shrimp aquaculture development, and in Asia Primavera (1993) started examining the socio-economic implications of the rapid development of shrimp farming and the loss of mangroves in the Philippines and Thailand. All these were pioneer studies that later

became the basis for the struggle between local communities and the shrimp farming industry.

This section will analyze the evolution of the movement against the shrimp farming industry, looking at how local manifestations against the industry have become a broader trans-national and global movement that incorporates environmental and social concerns into a common campaign for socially and environmental sustainable coastal development. It examines how this movement has the support not only of international environmental NGOs in industrialised countries, development assistance organizations, human rights groups, private foundations, but also that of researchers and scholars from the natural and social sciences.

An analysis of why grassroots resistance movements emerged in response to the development and expansion of the shrimp farming industry will show how collective action has been in many cases sparked by the decline of the biophysical environment and/or issues of natural resource access and allocation.

In the following section I will explore how local grassroots groups and NGOs have been able to transcend their localities (and diversity in terms of ethnicity, culture, nationality) to become part of a global network. I will show how global networking has been made possible by technical aspects such as, the use of information technologies (Internet, electronic mail, GIS) and the development of new multi and interdisciplinary methodologies such as economic valuation of natural resources and the flourishing of disciplines such as political ecology, social anthropology, human geography and ecological economics.

2.5.1 From local concerns to global resistance

One of the most critical social problems identified by local communities as part of the expansion of the shrimp farming industry is the loss of communal resources, such as mangroves, upon which local people depend. As it will be analysed in chapter 6, mangrove ecosystems have been the providers of, not only subsistence, but commercial goods for local communities for hundreds of years. Its conversion into shrimp ponds was one of the first sparks in the struggle between local communities and the shrimp farming industry.

This struggle has lead to violence[38], arrests and court battles between local groups and the industry.

Faced with the loss of their livelihood, local communities started protesting and creating small resistance groups. India is a very good example of the resistance movement against shrimp farming which illustrates how, through networking and NGO support; local concerns have got a 'voice'. In 1992, in the Indian state of Orissa, villagers and the local NGOs protested against the development of 50 semi-intensive shrimp ponds by calling for an environmental impact assessment. Locals feared the strain on fresh water resources, the pollution from intensive shrimp farming and the corresponding lowered productivity of fisheries in the area due to the collection of wild post-larvae. But it was the salinization of their agricultural land together with the arrest of a local activist that prompted the local community to form the People's Alliance Against Shrimp Industry[39] (PASI). As a result, they coordinated a national movement against the shrimp industry and collected evidence to present to the Indian Supreme Court (PREPARE 1996). This was to change the face of shrimp farming politics globally. On August 24, 1995 the Supreme Court ruled that no further intensive aquaculture industry would be permitted in Indian coastal states (Tamil Nadu, Orissa and Andra Pradesh). The court ordered that local farmers would be compensated for losses caused by the industry. This court ruling was the first successful legal move against the farming industry and invigorated the movement around the world

Loss and degradation of common resources (land, water, mangroves, fisheries, etc.) have provided a common ground for environmentalist and grassroots organizations to band together. The creation of the Mangrove Action Project (MAP), is a good example of this type of coalition, MAP is a network building institution, whose mission is:

> *"to protect mangrove forests worldwide from threats posed by shrimp aquaculture and other forms of unsustainable development, while promoting the rights of local communities to sustainably manage their coastal resources"* (MAP 2005b).

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[38] There are several reports of violence, human right abuses and killings related to the shrimp farming industry see for example EJF (2003), Shiva (2000), Primavera, (1997), Maybin and Bundell (1996).

[39] The alliance comprises leading social groups and community leaders from different states: Land for Tiller (Tamil Nadu), PREPARE (Andhra Pradesh), Orissa Krushank (Orissa), also the participation of the Research Foundation for Science and Ecology directed by Vandana Shiva and the GOA foundation (Halim 2004)

This mission statement synthesises some of the most interesting elements of the resistance movement against the shrimp farming industry. The first element is, that shrimp farming is the common enemy in the destruction of mangroves, secondly that local communities can sustainably manage the resource and thirdly that communities' rights are very important in the struggle. Interestingly, there is implicit acknowledgement that local communities are the best guardians of the mangroves and are able to use their natural resources in a sustainable way. This represents a change in the usual environmental stand that fragile ecosystems should be conserved using exclusionary protected areas, whereby local communities do not have a role to play. In my opinion, this is one of the first elements that has made possible the creation of global networks where environmentalists fight hand in hand with grassroots organizations to defend the mangrove ecosystem, thus providing a strong platform to create new institutional linkages and global advocacy.

Based in Seattle (Washington), MAP is a project of the Earth Islands Institute; which was funded in 1992 and provides an international rallying point for network building. By 2005, MAP's network included over 400 NGOs with over 250 individuals (including scientists, academics, journalists, legal experts and government officials) from 60 nations[40]. MAP's major strengths are its use of the internet as a tool for international networking and information dissemination which is done through an online newsletter, bi-weekly news bulletin, action alerts and public forums. According to Stonich and Conner (2000), MAP is the most comprehensive network building institution in the shrimp farming resistance movement which has well established linkages throughout South Asia, Southeast Asia, Latin America and Africa, serving as a bridge between north and south and between donors and local organizations.

One of the strengths of the resistance movement is to take their plight to the international fora. For example, in 1996 MAP co-organised an international strategy section on possible consumer campaigns. This meeting brought several grassroots NGO leaders from developing countries together with several northern environmental organizations; the idea being to tailor the consumer campaigns to the most important issues in producing countries. This meeting coincided with the United Nations Commission on Sustainable Development (UNCSD) where the NGOs presented a joint declaration (the New York Declaration) on unsustainable aquaculture during the UNCSD closing section.

[40] Alfredo Quarto, MAP Director statement (MAP 2005a)

This type of strategy has been one of the best tools used by the resistance network in order to have their voice heard.

The Choluteca declaration is another of the joint declarations made by the network, after an international NGO Forum on Aquaculture and its impacts held in Choluteca, Honduras in 1996. In this declaration, they recommended a global moratorium on shrimp aquaculture expansion until environmental reviews could be completed, the sustainability of the industry could be assured and the rights and interests of coastal residents could be protected (MAP 1996). The importance of the meetings and the declarations has been the wide dissemination of the material produced, and the type of participants: in Choluteca, for example, a representative of the Human Rights Watch attended to gather reports on human rights violations associated with the shrimp farming industry. Additionally, academics and scholars working on the impacts of shrimp aquaculture were invited to share their results with the NGO representatives. This strategy has made possible the creation of further links between grassroots organizations and international institutions to which they normally do not have access. Amongst others, important invitees were the Sierra Club of Canada, the Defence Fund, Christian Aid and Greenpeace International. In this way the movement is able to enhance links between north and south institutions, NGOs and research academics and spread their plight to a wider audience.

One of the clever parts of the strategy is that social and natural scientists can provide expertise to the networks, for example, Dr. J.H. Primavera and Dr. S. Stonich are among the highly recognised experts who have provided their expertise to MAP or some of the other action networks. Academic and scholarly expertise has also become basic to the resistance movement, and many of the international environmental NGOs now have trained teams producing hard evidence on the real cost and benefits of the shrimp farming industry (for example Environmental Justice Foundation, Public Citizen, Greenpeace, etc). The information produced is then shared via the internet, within the network and is sent to international institutions, the media and other networks such as FAO, NACA, etc., in this way the network gains more and more advocates.

To be able to network and to appeal to the international fora, they have also learnt to use other strategies. For example, the New York declaration was softened and presented to the World Conservation Congress (IUCN) in Montreal; in this way the resolution obtained

the support from IUCN member states and was approved. Although the IUCN resolution is a non-binding resolution, nonetheless it represents an important step forward at the political level. The IUCN resolution was circulated (by Greenpeace) at the FAO Food Security Summit (Rome, 1997) and was used during the following FAO committee on fisheries. This is a very good illustration of how, through changes in discourse and participation in international events, the network has been able to put the issue of unsustainable shrimp farming into the international political arena.

This extensive network of NGOs, activists, researchers and journalists has been made possible by the use of the internet, e-mail systems and distribution lists. In that way new technologies have helped to create a global resistance against industrial shrimp farming.

2.5.2 Targeting demand

In March 1995 the Ecuadorian group Acción Ecológica called upon consumers in the United States and Europe to stop eating Ecuador's shrimp, "*consumers need to understand the relationship between what they eat in the North and the damage it causes to the environment in the South*" declared Cecilia Cherrez at the campaign launch (Acción-Ecológica 1995). Boycotts are one of the instruments used to raise awareness in consuming countries on the social and ecological impacts of the shrimp farming industry. Targeting consumers in the rich 'north' is another common platform from which south and north NGOs can join efforts to pressure the industry whilst working together.

This strategy not only allows the movement to spread their plight to a wider audience, but reach beyond weak governmental controls and tap into current international debates such as sustainable development, globalization, human rights, poverty alleviation, etc. This is especially important because, as discussed above, the shrimp industry and its devastation are driven by complex international economics, and the challenges in stopping it are not unique to the shrimp crisis.

The presentation of the Environmental Justice Foundation (EJF-UK) "why prawn will make you sick" campaign illustrates this point very well:

> *"Only through growing consumer demand for ecologically sustainable and ethically produced shrimp will vital changes develop within the industry, helping to end the devastation of marine and coastal habitats, the*

displacement of communities and the conflicts that have led to intimidation, violence and murder" (EJF 2005c)

What is interesting is to see how international environmental groups are changing their practices and discourses. Now they are using communication technologies at their best, and tapping into most comprehensive, global discourses. They are linking what we eat here with what happens there, and appealing to our moral duties and obligations as citizens of the world.

Another interesting aspect of this strategy is the fact that north NGOs are very keen to show they are in permanent contact with the grassroots organizations in the south, and that they are working together, see for example the Swedish Society for Nature Conservation (SSNC) shrimp campaign web page:

"*SSNC and our partner organisations in countries with shrimp farms call on all Swedes to desist from buying tropical shrimps sometimes referred to as tiger prawns or scampi. SSNC co-operates with organisations in Indonesia, Malaysia, Ecuador and Honduras and is supporting their efforts to stem the expansion of shrimp farming*" (SSNC 2005)

Although the north-south relationships are not always perfect (see next section), I have been able to appreciate[41] the togetherness in relation to the campaigns in the north. For example, reports are translated into Spanish, representatives of the south groups are always invited to campaign launches and to tours in the consumer countries. Details, strategies and content of reports are normally discussed as well.

The strategy has been strengthened by health safety scares in Europe and USA due to the antibiotic and chemical use and the widespread of diseases in the industry. As Lider Gongora describe it:

"The finding of chloramphenicol in shrimps is great, now we have found something that cause pain to them [the consumers], and we will use it, because with this shrimp farming is not only our problem any more" (Interview, July 2002).

[41] Through my participation in the e-mail exchanges of the discussion list and the virtual forums organized by the Mangrove Network.

Even though there is not a boycott as such at the moment, there are an incredible number of campaigns asking people in the consuming countries (especially Europe and USA) to stop buying or eating tropical shrimp.

2.5.3 North-South struggles

North-South relations among the coalition are currently good, especially in the campaigns targeting demand (see above). However, this has not always been the case. In 1999 tensions erupted in the global resistance coalition when a founding member of ISA Net and former ISA Net steering committee, announced the formation of a new grassroots organization composed primarily of members from India. The position from India was, that shrimp farming presented a problem to the people in the South and that any movement against it should be organised and run from the South. Northern members of the coalition, they believed, were too powerful in the coalition (Stonich& Conner 2000). India was the first departure, and then in 2001 the Latin America members left ISA Net and established the International Mangrove Network (Red Manglar).

The Latin American member's departure was the result of political divergences and the expulsion of Ecuador from ISA Net steering committee. According to Lider Gongora (Executive secretary of Mangrove Network,)

> *"they expelled me when I started asking questions about the real stand of ISA Net and MAP, on one hand they were telling us they supported our struggle against shrimp farming, but on the other they were working with WWF and the shrimp farming industry, for what they call sustainable shrimp aquaculture. As you know our position here (in Ecuador) and in the other Latin America countries, we do not believe shrimp farming is sustainable. If we start talking about sustainability and all that, then that is legitimizing an industry that has caused so much destruction. They do not understand that because they do not live here, they do not depend on the mangroves to feed their children, they live there in their nice houses getting lots of money to talk about our struggles"* (interview July 2002).

Lider's comments are an illustration of the type of underlying tensions and suspicions that NGOs and grassroots groups from the south have about their northern partners. One of the major problems aroused when WWF became part of the

WB/NACA/FAO consortium. When they found out that ISA Net was receiving money from WWF, they decided that ISA Net was not interested in representing the mangrove struggle anymore, what they were doing was using the south NGOs and grassroots to justify the industry.

> *"We break from them because we need a network that really represents us, the communities and our needs. The fact that ISA Net is talking about sustainable shrimp farming is telling us that what ISA Net is doing at the end of the day is promoting the industry's interest"* (Marianeli Torres, Mangrove Network, Interview July 2002).

Currently, the International Mangrove Network comprises more than 500 grassroots organizations in 11 countries in Central and South America with Greenpeace International the only international NGO.

> *"It is our network now, we are running it, we are happier this way, we do not have powerful people telling us what to do. Now in our own terms, we have established very good relationships with several international NGOs, these are people that understand our problems: Environmental Justice Foundation, UK; the Public Citizen,USA; Swedish Society for Nature, Sweden"* (Lider Gongora, Executive Secretary, Mangrove Network, interview July, 2002).

What is interesting is to see that the Mangrove Network has learnt the tricks of the game and is using the same tools used before by the international coalition. They send representatives to the major international fora and have also entered the new digital era, have their own webpage, run a very efficient e-mail system, have a good distribution list and organise virtual forums. They have also established links with academics and researchers, several research institutions are part of the network and all the information produced is shared through a virtual network in Spanish. The advantage of the digital world is that information is shared in a cheap, easy and quick way, so small grassroots groups are not isolated anymore. Also, they are establishing links with Asian and African networks which are fighting against the shrimp farming industry. The south is becoming more cunning and sophisticated in their approach to the north, they know very well they need their partnership, but what they are doing now is establishing a balance in the relationship, this time they are deciding the rules of the game.

2.5.4 The industry's response

Growing organized opposition to industrial shrimp farming has stimulated a similar type of networking among the defendants of the aquaculture development, producers, processors, input suppliers, wholesale buyers and many scientists associated with the World Aquaculture Society (WAS) have clustered under the Global Aquaculture Alliance (GAA). The GAA was formed in 1997 and its rhetoric is that of promoting industrial sustainable aquaculture as the only means to increase seafood supply[42]. In reality GAA was created to counter claims made by the opposition networks and to lobby on behalf of the industry. GAA represents the shrimp farming industry (and other aquaculture enterprises) on issues of public relations, the environment and international policy (Rosenberry 1998:256). GAA also publishes a newsletter (Global Aquaculture Advocate) and maintains a website. Compared to its critics, the GAA has substantial financial resources. Corporate memberships in the GAA were set at US$10,000 each, with an overall budget for its first year of operation proposed at US$500,000. Of this, US$100,000 was earmarked for educational purposes and US$25,000 was identified for the costs of consultant's services in developing "best management practices." The remaining funds were to be used for management and travel, in short, for purposes of strengthening the GAA as an organized voice of the shrimp industry (Stonich& Conner 2000).

GAA has adopted a non-confrontational strategy in addressing industry critics instead, it has called for a careful scientific assessment of the ecological impacts of shrimp farming. With substantial financial resources, GAA has been able to commission scientific studies to counterclaims that shrimp farming has been responsible for extensive destruction of mangroves and to recommend a set of best management practices to guide producers. This has been published as the new Code of Practice for Responsible Shrimp Farming (Boyd 1999). In this way, GAA has managed to set the debate on scientific grounds and good science, limiting its response to the other issues voiced by the NGO coalition. What is interesting about the GAA's strategy is, that defining issues in such a narrow scientific nature is undermining the credibility of local voices and experiences which I elaborate on below.

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[42] The Global Aquaculture Alliance is an international, non-profit trade association dedicated to advancing environmentally and socially responsible aquaculture. GAA recognizes that aquaculture - the culture and farming of fish, shellfish and other aquatic organisms -is the only sustainable means of increasing seafood supply to meet growing food needs. GAA therefore promotes best management practices for sustainable aquaculture through its Responsible Aquaculture Program, conferences and other activities (GAA 2005).

By framing problems related to shrimp farming in narrowly scientific terms and claiming primacy for scientific evidence, the GAA is able to ignore, or claim as invalid, the local knowledge expressed by local people, NGO leaders, and their supporters. Arguments and data presented by individual social and natural scientists critical of industrial shrimp farming have been ignored or discounted as anecdotal evidence or, as examples of exceptional circumstances that do not reflect the larger reality. The power of the pro-industry coalition presents considerable obstacles to the goals of the global resistance network. Especially significant are pro-industry efforts to silence the voices of local people about the violence and conflicts that occur almost daily (Stonich 1998).

The fierce criticism of the IFI's role in the development of the industry and the "strong interest globally in shrimp farming and issues that have arisen from its development" (World-Bank *et al.* 2002: iii), caused the World Bank and FAO along with the World Wildlife Fund (WWF) and National Aquaculture Centres in Asia and the Pacific (NACA), to create a consortium to analyze the interactions between shrimp farming and the environment. The main goal of the consortium is to provide the best management practices for a sustainable shrimp aquaculture[43]. The program was initiated in August 1999 and comprised 35 reviews with complementary case studies on different aspects of shrimp aquaculture. One of most interesting aspect of the reviews and case studies is the emphasis on management and technological fixes. Of the 35 reports produced only one is devoted to the social aspects of the industry (World-Bank *et al.* 2002:14), but only in one country, Bangladesh. There is the mention of a global review on the best management practices (BMP) of the industry in poverty alleviation and social equity in the 2002 report, but up to June 2005 there are no copies of the review or mention of it in the consortium web page[44]. Interestingly, the Bangladesh case study on social aspects does not appear either. Again, we can recognise a bias towards addressing environment impacts and

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[43] The objectives of the consortium program are: (a) Generate a better understanding of key issues involved in sustainable shrimp aquaculture; (b) Encourage a debate and discussion around these issues that leads to consensus among stakeholders regarding key issues; (c) Identify better management strategies for sustainable shrimp aquaculture; (d) Evaluate the cost for adoption of such strategies as well as other potential barriers to their adoption; (e) Create a framework to review and evaluate successes and failures in sustainable shrimp aquaculture which can inform policy debate on management strategies for sustainable shrimp aquaculture; and (f) Identify future development activities and assistance required for the implementation of better management strategies that would support the development of a more sustainable shrimp culture industry (World-Bank et al. 2002:iii).

[44] The webpage is the source of all documents produced by the consortium, and according to the policy of the consortium all reports will be available for public scrutiny at NACA website (eNACA 2005).

basically to disregard the social effects of the industry. According to GAA the root of the environmental and social problems is the lack of planning in coastal use, whereby the problem can be avoided by the adoption and implementation of management tools, such as planning and zoning. Also, the majority of the damaging effects can be rectified by the implementation of BMP. There is not a hint of recognition that maybe it is the intensive industrial model that is not socially and environmentally suitable, and that shrimp farming should not be promoted everywhere in the developing world uncritically.

It is true the industry has changed in recent years and has adopted the rhetoric of sustainable development. However, there are two important issues that need highlighting before taking these "successes" at face value. Firstly, that the industry's definition of sustainability is very different to grassroots and environmental NGOs definitions. The sustainability of shrimp farming, according to the industry, is a technical problem solvable by better engineering, management systems and regulations at farm level. In other words their focus has been in terms of the factors that make a farm operationally sustainable and as a business investment activity. Their BPM aims are how to guarantee large scale production and profit without disease problems, while ensuring supply of 'safe' shrimp for the global market. A far more difficult task involves the development of mechanisms which reflect the larger social, community, and ecosystem concerns. Aspects, we know, are an integral part of sustainable development and will improve the processes by which, decisions on institutional arrangements are made and implemented, not only at farm level but in the national and international context.

Secondly, the sustainable rhetoric does not go farther than the design and publication of Codes of Conduct (COC) and BMPs. Adhesion to them is voluntary, and at the moment there is no incentive for farmers and investors to adopt them. The industry assumes that because some of the BMPs are cost-effective they will become self-regulated by the industry (Boyd *et al.* 2002). This argument shows a total lack of knowledge about how the industry expands within the developing countries, where it is cheaper to build a new pond in a pristine area with clean water and good supply of seed, than to treat effluent discharges, or to pay for hatchery reared seed. Because COC and BMPs are voluntary there is no mechanism for external evaluation, verification and/or monitoring. Also, the fact that COC and BMPs were prepared by the industry and technicians, without the participation of

all stakeholders, means that significant issues such as the social impacts are totally neglected.

An important aspect to note here is, that the GAA's creation and the other industry initiatives are showing that at least the other voice, the voice of the poor is being heard and at least, has made the mighty industry change its discourse. What is worrying is that the lack of recognition of the real social impacts of the industry has resulted in the industry being implemented in other countries, especially Africa, with minimal modifications of the 'old' model. What is incredible is that even the IFC is not following COC and BMPs. Detail examination of IFC environmental reviews for their latest shrimp projects approved in Africa (IFC 2001, 2003), shows how they are still massive enterprises (5,500 and 3,500 ha respectively). It is also possible to observe non-best practices such as lack of effluent treatment, the use of wild seed and brook-stock, mangrove cutting, etc. The fact that new projects such as their investment in Venezuela is suffering from an outbreak of TSV and WSSV[45], and the fact that even in 2005 the Federal Environmental commission found that the Brazil farming industry is destroying mangroves (Pinto 2005), it is telling us that the industry has not learnt from past errors and that in reality not much has changed in the way the industry develops.

2.6 Shrimp farming in Ecuador

In Ecuador the first commercial shrimp pond was constructed in 1969. By 1982 Ecuador had the world's largest area under shrimp production, growing exponentially for more than 25 years. By 1991 132,000 ha of coastal land had been converted to shrimp ponds (Tobey *et al.* 1998). According to the Ecuadorian Forestry and Natural Areas Wild Life Institute (cited in FUNDECOL 2000b), by 1999 the total area occupied by shrimp farms in Ecuador was 208,000 ha[46]; today Ecuador, together with Indonesia, has the largest surface area of built shrimp farms.

2.6.1 Shrimps or mangroves

Extensive and semi-extensive shrimp farms are the most common in Ecuador, therefore one of the most significant impacts of the industry has been the cutting of mangroves for the construction of ponds. According to CLIRSEN (Centro de

[45] On the 9th of March 2005 the Autonomous Service of Agriculture Health in Venezuela announced an outbreak of TSV in 3 different states. It is the first time TSV is reported in the country (OIE 2005b).
[46] It is important to note that in the international statistics the Ecuador's reported hectares under production are only 100,000 (see for example: Tacon, 2002).

Levantamiento Integrado de Recursos Naturales por Sensores Remotos) in 1969, Ecuador mangrove cover was: 362,727 ha (MAG 1987). The 1999 CLIRSEN updating study of mangroves and shrimp-farms cover, reported a mangrove cover of 154,087 ha, which means that at least 208,000 ha of mangrove have vanished, resulting in a loss of 57% during the last 30 years. This rapid loss of mangrove cover is mainly attributed to the massive and uncontrolled expansion of the shrimp aquaculture in the Ecuadorian coastal zone (Bodero& Robadue 1998). Figure 2.3, illustrates the increase of shrimp farming construction and the decrease of mangrove cover in Ecuador in the last 30 years.

The best way to illustrate how the shrimp farming industry expanded in Ecuador is the description given in the book "Eight Years in Ecuador: the road of integrated coastal management" written by the Management of Coastal Resources Program[47] (PMRC):

> *"The great monetary profits that can be made in shrimp mariculture prompted anarchic, gold-rush-like expansion on the industry in the 60s, 70s and 80s. This occurred without a meaningful planning, controls, or consideration of long term impacts. It was common in the early years of development for shrimp farmers to recover the entire investment in a new farm within a single year"* (Olsen& Coello 1995, p.1).

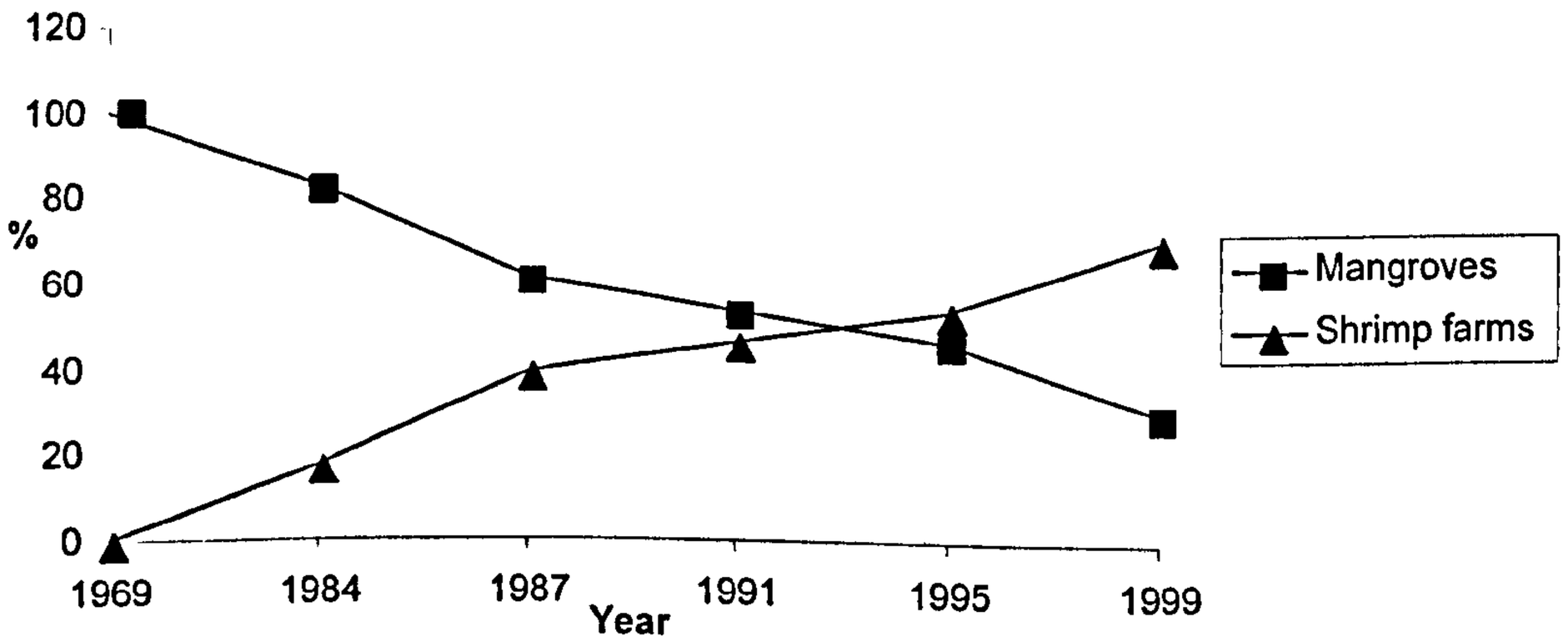

Fig. 2.3 Percentage of mangrove cover lost and percentage increase in the number of shrimp farms increase from the initial 1969 official estimates in Ecuadorian coastal zone (Adapted from: FUNDECOL 2000b)

[47] A government program funded by USAID and implemented by the Coastal Resource Center from Rhode Island University.

In this gold-rush expansion, the losers were the mangroves and the communities that until that time have depended on them for their livelihoods. According to the International Mangrove Network at least 90% of shrimp farms in Ecuador are built on former mangrove areas (RMI 2003). Shrimp farming construction devastated some of the major estuaries in the country, some of them experiencing losses of up to 80% mangrove cover (Bodero& Robadue 1995). This destruction included not only the permanent loss of forest cover, but also the underlying riverine basin and fringe mangrove environments that serve as habitat and fishing grounds. The construction of farms, walls and dikes resulted also in modifications to the estuarine hydrodynamics system.

According to PMRC research many thousands[48] of families were displaced, sometimes forcibly, from mangroves and estuarine fishing grounds where they have traditionally made their livings. Mangrove wetlands, creeks and flats have either been converted to ponds and intake channels, or privatised as buffers to shrimp ponds to which, pond operators do not permit free access. In Bahia de Caraquez alone, communities of mangrove and bay fishers had to emigrate to other parts of the coast when shrimp farms destroyed 80% of the estuary's mangroves and its once-rich fisheries collapsed (Bravo& Abarca 1995).

Depletion of mangrove resources and the exclusion of traditional users of the coastal areas was made possible by the complex coastal areas management regimes and also the way mangroves are conceptualized in the country. These aspects will be analysed in detail in chapter 4. What is important to note here is, that the impacts of the industry on the coastal ecosystems are more profound from a long-term perspective than immediate social impacts may suggest. The industry not only cut mangroves but engineered every riverine estuary and lagoon along the entire coast (with the exception of northern Esmeraldas). The effect of these changes would modify the whole coastal dynamics, increasing the vulnerability of the entire coastal area. The devastation produced by El Niño in 1998 (CAF 2000) give us a clear indication of how vulnerable the coast has become. It will be interesting to see how climate change and sea level rise will affect the area. At the moment, the 2004 Tsunami has delivered a clear message of the vulnerabilities of the modified

[48] There is no clear how many people has been displaced in the country due to shrimp farming industry, there are not proper statistics or research, PMRC has done some calculations based on population density and ha loss.

coastal areas. According to preliminary data by UNEP, the mangrove forest acted as a buffer for the impact of the waves, so, areas where mangroves remained, suffered remarkably few casualties than those where mangroves has been cut down to make room for shrimp farms or other developments (UNEP 2005).

2.6.2 The international financial institutions' role

The macroeconomic factors that supported the rapid expansion of the shrimp farming industry in Ecuador are not different from the factors analysed in section 2.3.1. In the 1970s Ecuador was a country with a large external debt and serious economic problems, and as such it was an ideal candidate for IMF and World Bank conditional loans. SAPs were introduced in the country in the early 1980s, and Ecuador's development strategy shifted from the 'old' state-led ISI[49] to a more neo-liberal approach. New policies were introduced aimed at removing market distortions, and to increase competitiveness and encourage export-orientated enterprises. This export led, free trade model, encouraged the development of non-traditional exports (NTAE) such as flowers and shrimps.

NTAE received substantial financial and technical support from overseas. For example the USAID office in Ecuador began funding a technical support program to increase the value of NTAE enterprises (Coulson 1999). Shrimp farming also received international technical assistance from Canada, France, Japan and USA. During the 1980s, USAID provided technical assistance for the development of hatcheries, also the National Center for Aquaculture and Marine Research (CENAIM) received significant capital aid from JICA (Noriega-Curtis& Vera-Rivas 1989). Also the new policies made it easy for foreign investment, according to a FAO report by 1989, US investment in the Ecuador shrimp farming industry had possibly exceeded US$300 million (Noriega-Curtis& Vera-Rivas 1989).

Based on research carried out by Gencianos and Baker with the support of ISA Net and Greenpeace, FUNDECOL calculated that between 1980 and 2000, US$957 million dollars from development projects supported by the World Bank have indirectly supported the shrimp farming industry in the country (FUNDECOL 2002:6).

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[49] Import Substitution Industrialization

2.6.3 Who benefits from the industry

As was analysed in section 2.2.1.1, shrimp farming in Latin America has been an industrial-scale activity, with Ecuador at the centre of this development. So, it is not difficult to understand how from the start, the industry is being characterised by large-scale enterprises that put the industry out of reach to all but the wealthy. Another important factor has been the fact that the industry falls under the Fisheries Law which requires that all commercial operations should be vertically integrated to include farms, packing houses and shipping operations. This has encouraged the channelling of economic benefits to the wealthier segments of Ecuadorian society and to a number of foreign investors (Olsen& Coello 1995). In 1989, Noriega-Curtis and Vera-Rivas found that companies financed or managed by foreign owners controlled the shrimp export business, shrimp feed and fertilizers and shrimp farms and hatcheries. So, we can argue that the economic benefits of the industry have been primarily for the farm owners and foreign investors.

But surely the industry is generating hard currency for the national budget? Well, according to the PMRC research, the economic returns of the industry to the national budget are difficult to estimate. "*Firms are supposed to pay a percentage of their net earnings as tax, but tax evasion is widespread. Ecuador does not have a graduated income tax. Because the land concessions of public lands are so cheap not much is made from there. Thus un-like petroleum, which is a state-owned resource, a relatively small proportion of shrimp export earnings flow to the government to support its programs and meet the annual interest payments of the country's massive national debt*" (Olsen& Coello 1995, p.7).

Since 2001, due to disease outbreaks faced by the industry (see below), the government initiated a 'salvage' (*salvatage*) program to help the recovery of the industry. Among the help measures the industry has been offered urgent loans with soft interest rates, and in some cases written-off debts. In 2004, the government gave the industry US$100.000 to help in the industry's appeal to overturn the sanction imposed by the US Commerce Department in the anti-dumping case[50].

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[50] On December 31, 2003 the US Department of Commerce at the requests of US shrimp fishermen, initiated a dumping action against imported shrimp from China, Vietnam, Thailand, India, Ecuador and Brazil. These countries are accused of pricing shrimp at less than the normal price, and are causing material injury to the domestic industry (RTE 2004). In early 2005 the Department of commerce announced final margins of

2.6.4 A healthy industry?

The shrimp farming industry in Ecuador has suffered several production crises which are basically the result of disease outbreaks. The list of diseases in Ecuadorian farmed shrimp is long and as figure 2.4 shows, have caused several major disruptions in the industry's production. The first important outbreak occurred in 1989 and was caused by a *Vibrio sp.* bacteria, it was called the Seagull syndrome. Then in 1992 a new disease appeared in the Taura River and spread through the Gulf of Guayaquil. Initially the disease was allegedly caused by banana pesticides (Stern 1999), but as research later found the disease was caused by a new shrimp virus that is now known as the Taura Syndrome Virus –TSV (Brock 1997). TSV has become an important factor affecting the economic viability of shrimp farming in the Americas and has spread to Asia.

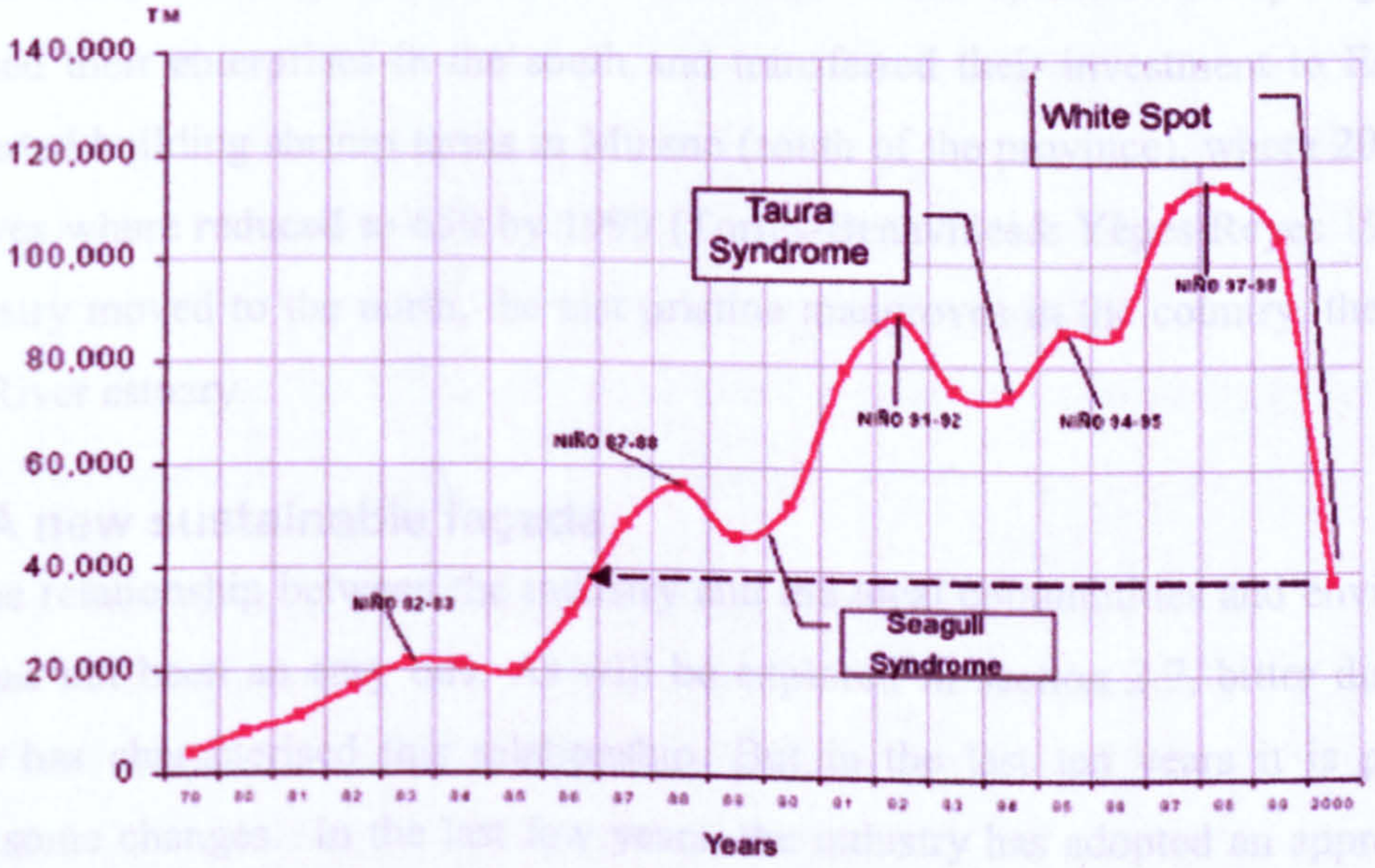

Figure 2.4 Shrimp production and major disease outbreaks in Ecuador (Source: CNA 2005b)

In March 1999 the first news of the presence of White Spot Syndrome (WSSV) were announced. By December 1999 shrimp production fell to below 1985 levels (FAO 2003a). According to the National Aquaculture Chamber by 2000 the direct loss to the industry due to WSSV was US$600 million (CNA 2005b).

3,58% to be applied to all farmed shrimp exports from Ecuador. This is the lowest rate announced for any of the six targeted countries (GrowFish 2004).

The causes of disease outbreaks in Ecuador can be summarised as: shortage of clean water supply, location of farms, and the import of pathogens[51]. Water quality decreased due to lack of effluent treatment and the high density of farms in the same area. Declines in water quality resulted in an insufficient capacity to remove waste, in other words, the industry self-polluted itself. The location of shrimp farms in mangrove environments leads to acidification which lowers disease resistance of the culture animals which causes them to be more easily attacked by external pathogens (such as the WSSV) that are being introduced into the system.

Diseases not only impaired production, but increased the use of antibiotics and other chemicals which spread to the wild shrimp populations. The outbreaks also intensified the pressure to build shrimp farms in the Esmeraldas province, an area considered environmentally 'healthy' until 1990. After the Taura epidemic many big investors abandoned their enterprises in the south and transferred their investment to Esmeraldas. They started building shrimp farms in Muisne (south of the province), where 20,000 ha of mangroves where reduced to 650 by 1999 (Torres-Benavides& Yèpes-Reyes 1999). Then the industry moved to the north, the last pristine mangroves in the country, the Cayapas-Mataje River estuary.

2.6.5 A new sustainable façade

The relationship between the industry and the local communities and environmental NGOs has not been an easy one. As will be explored in section 2.7, bitter disputes and violence has characterised this relationship. But in the last ten years it is possible to identify some changes. In the last few years, the industry has adopted an approach more attuned with the international industry rhetoric of sustainable aquaculture. Producers, exporters, feed processors and whole sealers have clustered around the CNA. Their mission is to 'encourage the development of aquaculture, with a deep respect to the environment, and contributing to the development and growth of the country'(CNA 2005d), a very similar statement made by GAA's (see section 2.5.4). They have also adopted the code of practice for sustainable aquaculture and since 2003 have banned the use of, fabrication or import of chloramphenicol and nitrofurans (CNA 2005c).

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[51] By 1984 the industry experienced a shortage of seed. Before there was a total dependence of wild post-larvae, but due to the increase number of ponds, decline in water quality and destruction of post-larvae habitat (mangroves), the industry became totally dependant on imported seed. Due to a lack of bio-safety protocols in the seed imports several pathogens were imported into the country, including WSSV.

As the WB/NACA/FAO consortium received environmental endorsement from WWF (see section 2.5.4), the CNA has also received environmental 'blessing' through a collaborative program for mangrove monitoring[52] with *Fundación Natura* (the largest Ecuadorian environmental NGO).

In reality, the situation has not changed much, though the mangrove cutting has slowed-down, there are still shrimp farms being constructed in mangrove areas. For example, the grassroots groups of El Oro province have denounced the illegal cutting and building of shrimp farms in their area (e-mail communication through the Mangrove network distribution list). Whereas, in the north, the Mangrove Project found that some of the shrimp farms in the REMACAM area are being extended (Edgar Lemos, phone conversation, January 2005). The use of wild-caught larvae is still wide-spread (Guest 2003) and there is no word of effluent treatment in any of the shrimp farming areas. As analysed in section 5.4 the industry has adopted a sustainable rhetoric, but in reality, does not even follow its own BMPs, for example CNA, with international financial support has encourage research into shrimp diseases, but there are not mechanism to enforce shrimp farmers to adopt recommendations. For example, an early detection system for a white spot epidemic developed by the CENAIM has not been put into practice due to industry apathy. Only 2 farms signed for the program (Bayot 2005).

2.7 The Mangrove defence movement in Ecuador

The economic, social and ecologic impact of shrimp farming in Ecuador has generated the creation of several political, ecological and social organizations over the years. What is very interesting is, that during the 1970s and 1980s, there is little information about protests against the shrimp farming industry. There is, however, anecdotal information of violent confrontations between local communities and shrimp farms armed guards (Acción-Ecológica 2001, Yèpez-Reyes 2004)}. In 1986, in the Guayaquil area, (south of the country where the shrimp farming boom started), the local environmental NGO (*Fundación Pedro Maldonado*) joined forces with a national ecology group (*Acción Ecológica*) and started an awareness program about the misuse of Ecuador's natural resources, particularly mangroves. In the same year, the international mangrove expert Paul Snedaker examined the status of the mariculture industry in Ecuador and its

[52] This collaborative program is highlighted as best practice even in the World Bank Report 'Shrimp and the Environment (World-Bank *et al.* 2002) and the Ecuadorian Export Federation (Fedexport 2005), however there is not information about it in the Fundacion Natura's webpage.

impact on mangrove ecosystems. His report recognises the rapid loss of mangrove ecosystems and warns of the possible impacts in artisanal fisheries and shrimp post-larvae supply (Bodero& Robadue 1998).

It is not until 1989 that government, through the PMRC, created an inter-institutional mangrove working group to improve knowledge base and management practices in the mangrove areas. Several NGOs were invited to be part of the group, among them: *Fundación Pedro Maldonado, Acción Ecológica* and FUNDECOL. The PMRC also tried to engage with the industry, without success (Olsen& Coello 1995). The PMRC attempts were highly academic with managerial exercises that provided the government with good reputation but did not change the way the mangroves were used and abused in the country. Mangroves continued to be destroyed and local communities displaced. Chapter 4 will analyze in detail the reason why this management strategy did not work.

2.7.1 FUNDECOL and the National Mangrove Defence Coordination

The dynamics changed totally in the early 1990s when the shrimp farming industry moved to the north of the country, as it faced the strong opposition of FUNDECOL (Foundation for the Ecological Defence). FUNDECOL started as a local committee formed to question the construction of shrimp farms in their island Muisne, (south of Esmeraldas province) which was going to be divided in two by the construction of a big shrimp farm. All members were young local inhabitants, among them lawyers and members of the *campesino* movement of Muisne (OCAME). During the 1970s these youngsters were part of a youth group initiated by two Italian priests and educated under liberation theology methods[53]. The most important feature of FUNDECOL was the exclusive participation of local mangrove users, charcoal producers, crab gatherers, arc cockle gatherers and fishermen, as it will be explained in chapter 6, section 6.2.3.1 this aspect has defined the way FUNDECOL has carried out the struggle against the shrimp farming industry.

In the beginning, FUNDECOL acted only as a watch-group, monitoring the advances of the industry and denouncing improprieties to the authority. Over the years, with the

[53] The roots of FUNDECOL can be trace to this youth group and OCAME, their fight has always been a mix of practical and political objectives, for example at the same time the fight to obtain electric light for the island, they started a movement to get rid of the corruption in the municipal council and for the rights of the *campesinos*.

experiences and new alliances, it became a stronger organization with a legal branch, a mangrove replanting program and an education project. The success of the replanting program facilitated the signature of a rehabilitation and mangrove protection agreement with the government.

In 1992 FUNDECOL organised an international meeting with the participation of grassroots organizations from Colombia, Honduras, Peru and Brazil. This was the first attempt to join efforts and unify the struggle against the industry in the Latin American region. Even though they could not achieve this objective, their desire for a joint effort resulted in the creation a common front in the Esmeraldas province (*Frente Provincial*). The first and most important action of the *Frente Provincial,* was the regional protest and mobilization to save the Cayapas-Mataje estuary from the shrimp farming industry. As will be detailed in chapter 4, section 4.5 this estuary was the last remaining fully functional mangrove in the country, and contains the tallest mangroves in the world (Ochoa 1998). The estuary is also one of the last places in Ecuador where traditional mangrove activities have not yet been displaced. After constant struggle and regional and local protest, the government granted the status of ecological reserve to the area in 1996, and is known now as the *Reserva Ecologica de Manglares Rio Cayapas-Mataje* (REMACAM). The creation of the reserve is seen as a major political triumph against the shrimp farming industry in the country.

The same year the *Frente Provincial* participated in the international forum that produced the Choluteca declaration (section 2.5.1). This participation enabled the Ecuador movement to further its links and alliances with international NGOs. In 1998 the *Frente Provincial,* supported by Greenpeace international, launched the first national campaign for mangrove defence. At the same time the *Frente Provincial* became the National Mangrove Defence Coordination (C-CONDEM) to be able to include groups and organizations from all over the country[54]. As a unified national front, and with international support, the movement started demanding that the government stop the expansion of the shrimp farming industry in the mangrove areas and give the remaining mangrove areas to local communities for their management and rehabilitation. They believed the only way to protect the remaining mangroves in the country is to give them to the local communities, according to them, traditional gatherers will be best stewards of

[54] Currently C-CONDEM represents more than 100 grass-roots and environmental organizations.

mangroves. Chapter 7, section 7.3.3 will analyse the steward process initiated by the C-CONDEM.

Another important component in the C-CONDEM strategy has been the use of legislation to stop mangrove destruction, as Veronica Yépes (International coordinator C-CONDEM) put it, "*even though the national legislation has been used and abused by the powerful shrimp farmers, laws and decrees are the only legal possibility to prevent the total destruction of mangroves in the country. In order to get our objectives, we need to brandish the same weapons*" (Yèpez-Reyes, 2004:3). The C-CONDEM has successfully challenged several government law proposals and has pressured the government into approving special legislation for the protection of mangroves see chapter 6, section 6.4.4. Currently C-CONDEM has presented a new communitarian mangrove management law to the government, this law is being debated in the Ecuadorian Congress and will be analysed in detail in chapter 7, section 7.3.4.

2.7.2 International Alliances and support

Since its creation FUNDECOL, and now the C-CONDEM, have created strong alliances with international NGOs and organizations. These alliances have provided not only financial help for the functioning of the organization, but a platform for their voice to be heard in the International arena. SWISSAID for example, has provided financial support for the rehabilitation of the mangroves in the Muisne area, and, at the same time, has supported the legal branch of FUNDECOL, providing money for monitoring shrimp farm activities, and to denounce infractions to the environmental authorities. Currently HIVOS provides the financial support for the running of the outreach campaigns, webpage and communication strategy.

One of the alliances that has proven very beneficial is the liaison with Greenpeace International. In 1998, Greenpeace offered help and support to the Ecuadorian movement, and organised a visit to the country. During the visit they participated in a joint action with FUNDECOL to destroy an illegal pond and replant mangrove seedlings instead. This symbolic act gave birth to what has become the Mangrove Defence Day. The presence of the Rainbow Warrior (Greenpeace flagship) gave not only moral strength to the local groups, but protection from the illegal owners' response and police reprisals. The presence

also generated a media frenzy that put the mangrove defence plight at the centre of Ecuadorian news.

> *"It was the first time that we, the poor, the mangrove dwellers, were the centre of the news. Everybody was here, television, radio, newspapers, and even though it was sad because Daniel died*[55]*, it was a total success, for the first time every body in the country knew who we were*" (recalls Uberliza Libreros one of the mangrove warriors [as she calls herself], interviewed, February 2002).

The visit was very polemic for the industry and the government, but left a lasting legacy in the struggle to save the mangroves in Ecuador. The Greenpeace visit attracted other visitors such as Professor Joan Martinez-Alier, who has written about the Ecuadorian struggle (see for example: Martinez-Alier 2001), expanding even more the message to save the Ecuadorian mangroves.

Also important (as analysed in section 2.5.3) was the C-CONDEM pivotal role played at the creation of the International Mangrove Network (Red Manglar). Currently C-CONDEM is the holding the Red Manglar executive secretariat. Through this role the Ecuadorian movement is not only highlighting their mangrove plight internationally, but playing a very important role in the way mangroves are defended and managed in the Latin American region.

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[55] Hayhow Daniel Nanoto, crew member of the Rainbow Warrior died from a heart attack collecting water samples from the estuary during the campaign (FUNDECOL 1999).

Chapter 3 - Research design and methods

3.1 Introduction

The development of the shrimp farming industry in Ecuador, at the expense of mangrove ecosystems and the communities associated to them, provided a perfect setting to develop empirical research on the complexities of social, political and economic changes that arise from the introduction of neo-liberal reforms in developing countries. The REMACAM added some interesting and important ingredients, such as its protected area status, achieved through community pressure, and the existence of the Black Communities Process (PCN). Shrimp farming development in the mangrove areas also offered an excellent case to study the explicit link between social and natural processes, allowing an examination of local populations' responses to natural resource depletion, and an exploration of how local communities engage with current neo-liberal reforms.

Given that social-natural interactions are so complex, what should empirical work aim to explore in order to understand them under neo-liberal regimes? How can local dynamics and changes be meaningfully explored? After a long methodological review, it was decided that the best way to examine, and explore, social-natural interactions and local changes was to focus the empirical work on the creation and use of environmental discourses and narratives, and the use and politicisation of local knowledge in the defence and management of mangrove ecosystems.

By examining the effect of shrimp farming in the REMACAM through a environmental discourse and local knowledge focus, it is possible to reveal the role that a specific cultural environment can play in determining the relationship between neo-liberalism and the community and its individuals. Researching the discourses and knowledge of those involved in the process of using and defending the mangroves from the shrimp farming industry at a local level, permits one to consider how historical and cultural precedents influence the way in which people react to, understand and engage with socio-economic changes resulting from external reforms and pressures.

3.2 *Discursive political ecology*

To be able to explore the complexities of mangrove destruction and social strategies for its defence I combine a framework of concepts from political ecology and the analysis of articulated perceptions and discourse. Political ecology addresses the interrelationship of ecology and politics, examining how different social groups interpret and experience environmental change and conflict (see for example: Rocheleau *et al.* 1996). Within political ecology there has been a recent attempt to understand how these interpretations and experiences inform, and are informed by, environmental discourses (e.g. Peet& Watts 1996). The impetus for turning to discourse was the recognition that environmental conflicts are 'as much struggles over meaning as they are battles over material practices' (Bryant 1998, p.87).

A discourse is 'a constructed system of arguments, ideologies and interpretations that shapes social practices, affecting the way we see things and talk about them' (Hay 2000, p.187). The environmental discourse is the formalized discussion of environmental change and conflict. Each environmental discourse offers its own version of 'the truth', identifying the causes and effects of environmental change, the actors involved, and appropriate strategies to be adopted. In this poststructuralist view, 'truths are statements within socially produced discourses rather than objective "facts" about reality' (Peet& Watts 1996, p.13). Recent research has shown how environmental discourses function to define resource use and power relations at multiple scales (Bryant 2000, Leach& Fairhead 2000, Adger *et al.* 2001, Sundberg 2003). It has also highlighted the need to consider the actors that produce and contest these discourses, recognizing both the agency of individuals and the discursive and material limitations of the context in which they are situated (Bebbington 1996, Leach& Fairhead 2000).

One of the largest problems associated with examining how discourses function in local contexts is the incongruence between the global and the local. Global discourses are often negligible at the local level, partly because they lack essential contextual detail (e.g. Adger *et al.* 2001). There is thus a need to understand how ideas promoted in an international or national arena are articulated at the local level (Sundberg 2003).

A related concept that is often employed by political ecologists is the narrative (Adger *et al.* 2001). Environmental discourses and narratives are at the heart of discursive

political ecology and open the possibility of a serious discussion of how nature and environmental problems are represented and how discursive formations shaped policy and practice (Peet& Watts 2004, p.10). In this research environmental discourses and/or narratives around the mangrove ecosystem are used as an analytical tool to explore how cultural perceptions of the mangrove ecosystem made possible the development and expansion of the shrimp farming industry at the expense of the mangrove ecosystem and how insider discourse and narratives are now being used successfully to defend it.

3.3 Understanding the concept of local knowledge

Before discussing the methods employed to examine the use and politicisation of local knowledge for mangrove management and defence, it is necessary to provide a brief explanation of what is meant by the term local knowledge. In the last few years there has been a reassessment of the value of the knowledge held by local communities. A growing number of scientists and development professionals are recognizing that this knowledge could provide a valuable resource for sustainable development. Additionally the 1992 UNCED Conference gave new impetus to the use of indigenous knowledge by scientists and local communities in forging innovative strategies for the sustainable use of resource management (von Liebenstein 1998).

Although most authors refer to this knowledge as Indigenous Knowledge the meaning of the term is by no means clear to everyone, especially now that it is rapidly coming into more current use in development circles (Sillitoe 1998). There is a wide range of alternatives employed by the various practitioners and researchers, such as: Local knowledge, Traditional Wisdom, Traditional Knowledge, Local Technical Knowledge, Indigenous Technical Knowledge, Rural People's Knowledge and Traditional Ecological Knowledge. According to van Vlaenderen (2000) Local Knowledge (LK) can be regarded as the umbrella term for the others. By contrast Sillitoe (1998), suggests that the term Indigenous Knowledge (IK) should be the one to use as it has the widest currency in contemporary debates, and indigenous is the label [for better or for worse], that has caught on in development circles (Sillitoe& Bicker 2004:1).

Several researchers argue that IK and LK are interchangeable terms, they define LK as evolving over time under the influence of traditional knowledge, external factors, and agents, and individual innovations (IIRR 1993b, Maglinao& R. 1998, Sillitoe 1998,

Weizenfeld 1998). However other researchers maintain that there is a distinction between the terms local and indigenous. According to the latter the term, local, focuses on the locality in which the knowledge is used and embraces exogenous knowledge that has entered the local community over time. On the other hand, 'indigenous' tends to emphasize the knowledge based on experiences internal to a particular setting. But as Sillitoe (1998) points out, all knowledge potentially passes into the local pool, it is blended with what is already known. Thus rural people's understanding of natural resource management issues is a blend of knowledge from various sources, and it is impossible to disentangle them. This, together with the debates about the impossibility of a purely internally based knowledge, has made it generally accepted that the terms IK and LK are largely synonymous (van Vlaenderen 2000, p.1) and as such are used interchangeably in books and publications.

The debate however is not at rest and the term indigenous knowledge remains contentious, some academics still debate over the propriety of the term indigenous as it is difficult to determine the status of indigene, the measuring of indigenousness is not an exact science (see: Ellen& Harris 2000, Sillitoe& Bicker 2004). As will be explored in section 3.2.1, this debate became especially important during the adoption of a working definition for my research.

Moving from the debate over the meaning of the term, the question is how can this knowledge [whatever we call it: indigenous or local] be defined? What are its key characteristics? How can we recognize it? Ellen and Harris (2000) provided an extensive list of characteristics, among them the idea that this knowledge is rooted to a particular place, and a set of experiences generated by people living in those places. Also, this knowledge is a consequence of practical engagement in everyday life, and is constantly reinforced by experience, trial and error and deliberate experiment. These two characteristics, according to the authors, support the general observation that this knowledge tends to be empirical, and empirico-hypothetical knowledge rather than theoretical in the strict sense. As such, this knowledge would be found embedded in the non-verbal interstices of everyday technical practice, making it dynamic in nature, continually changing, re-interpreted and moulded. For Sillitoe and Bicker (2004) this knowledge includes, all knowledge held more or less collectively by a population that

informs the interpretation of things, and mixing past traditions and present innovations with a view to the future.

It is interesting to note that these characteristics somehow move the concept from its previous emphasis on proven ancient, original and distinctive customs, transmitted orally over several generations, to a more neutral ground where its ancestral connotation and the multi-generation transmission characteristics are replaced by a more dynamic and ever changing notion. Reasons for this focus shift could be a response to early criticism that IK was seen as static, unchanging and bounded (Halani 2004). Also, this can be the result of community knowledge systems being incorporated into development practise (see for example: Bicker *et al.* 2004).

Another important characteristic is that practitioners see these community knowledge systems as being opposed to the knowledge generated in laboratories, research stations and universities using a formal scientific approach (IIRR 1993a). This formal knowledge is acquired through an academic process of learning in specially designated institutions, it includes general laws and principles, which can be transferred from one situation to another, making this knowledge de-contextualised and somehow abstract (IIRR 1993a). By contrast, local knowledge is derived from the participation with others in everyday activities in a "real life" setting. So, it is tied to the activity, people have learnt due to interactions with their environment. Local people continually adjust to that environment or try to change it to meet their needs. Due to these characteristics community knowledge systems cover all aspects of life, all different spheres of life are contained in it (climate, health, economics, environment, etc). These characteristics make their knowledge holistic and culturally bound in contrast to formal knowledge, where practitioners tend to be specialists, knowing a great deal about few things. Also, formal science divides activities into disciplines given specific characteristics to each one, and making it more difficult to establish a relationship between different categories (IIRR 1996).

Sillitoe (2002) acknowledges this divide, but questions the cut and dried binary distinction between the two, and proposes a three dimensional curved space and sphere, in which the global plotting of different knowledges with scope for movement which reflects the dynamism of knowledges. This global model would, he suggests, help in the comparison and co-relation of different knowledges central to IK research and endeavours.

The global model conveys to the development community that local knowledge is not monolithic, but individually variable as is scientific knowledge. This model can easily accommodate Berkes idea's (see next section) about the how local knowledge systems are arising all the time.

3.3.1 Adopting a working definition

The debate about the terms and definitions of community knowledge systems became the focus of my first year as a PhD student, as it was very important to adopt a working definition and a methodological framework. During a preliminary visit to the fieldwork area, it became apparent that the term 'indigenous' itself was very contentious. At the presentation of my preliminary research ideas to the PCN, they made sure that I understood that the afro-Ecuadorian communities see themselves as separate from the Ecuador indigenous nationalities: for them the word "*indigena*" (literal translation of indigenous) refers solely to the indigenous tribes who populated the country before the Spanish conquest. They explained to me, that as a good example, the name of the World Bank approved local development programme PRODEPINE, was changed from its original name, '*Programa para los pueblos indigenas'* (Programme for the Indigenous Populations) to the 'Development Plan for the Indigenous and afro-Ecuadorian Populations', after they protested to the government. Hence they recommended that I adopt another name for my research.

Another important aspect, was the review of Fikret Berkes work on traditional ecological knowledge. In his book Sacred Ecology (1999) he argues that strictly speaking, the Caribbean is one part of the world in which traditional systems of knowledge and resource management do not exist, the people living there are descendants of the enslaved people brought over from Africa by colonists. It is interesting to note here, how aspects such as ancient and multi-generational are the basis of Berkes definition of indigenous knowledge. Their [Caribbean people] transformation into independent agricultural communities and into groups of fishers and forest users is relatively new (Berkes 1999, p.129). Communities do not possess detailed traditional ecological knowledge and time-tested management systems based on this knowledge. According to him, local traditional systems are often overwhelmed by population and resource pressures (Berkes 1999, p.140). However, he recognizes that new local knowledge and management systems are arising all the time. Thus the Caribbean islands provide good sites for field experiments on

the creation of environmental knowledge, and the evolution of community-based management systems that use this knowledge. For Berkes, local knowledge refers to recent knowledge, the non-traditional knowledge being created in places like the Caribbean.

It could be argued that our study area presents some parallels with the Caribbean isles described by Berkes. Even though the mangrove areas in the REMACAM have been inhabited since pre-Columbian times (see chapter 4, section 4.3.1), black communities arrived in the area after 1553 (for a detailed account see: Rueda-Novoa 2001b, chapter 3). Although, after bloody battles the indigenous tribes of the area signed some alliances with the new arrivals, the majority fled to the forest and river heads (Savoia 1990, 1992), leaving the area to its 'new' black inhabitants. According to several authors, the black communities in the Esmeraldas region have been fully integrated into the local and regional market economies for a long time (see: Whitten 1992, 1997, Rival 2005). Some anthropologists and historians (e.g. Santiago Paez, Nelson Reascos), have argued that black communities in the REMACAM and Esmeraldas should be called '*pueblos nuevos*' (new peoples) as are the Latin American *mestizo* communities. Like the *mestizo* communities in the country, black communities are constructing their own history, their own ancestrality. This is their right and we should respect that, however we need also to recognize that like the *mestizos,* they are 'new' to this environment and they are learning how to use it (Reascos 2003). These arguments closely follow Berkes arguments about the Caribbean isles, so I decided that the best term to describe the research I was conducting in the REMACAM area was local knowledge.

The use of this term allows the research to look into the creation of new management and defence strategies among the mangrove communities, and also allows the inclusion of one of the most important actors in the struggle against the shrimp farming industry: the mangrove defence movement. At the same time the use of the term 'local knowledge' avoids misunderstandings with the PCN leadership. This decision could be equated to Ruddle's argument that some scholars use the term local knowledge because it is the least problematical term (Ruddle 1994), but also as Ellen and Harris point it out, the words we use to describe community knowledge are not insignificant (Ellen& Harris 2000). The adoption of LK says something about the direction from which I was approaching the subject, and the assumptions I was making about it.

In choosing the term LK, I am interrogating the potential effects of different knowledges and representations, and selecting particular representations because of their potential political effect. As Cameron and Gibson (2005) remind us, within the one community or group there may be multiple representations and conflicting knowledges that need to be adjudicated. The strategy I chose in this research was to concentrate on the potential political, and transformative effects, of the different knowledges and cultural representations of mangrove ecosystems, and how these knowledges and representations are being used to manage and to defend the mangroves against the shrimp farming industry, and to engage with neo-liberal reforms in the study area.

In this context the definition that best describes my proposed research is that of Gilbert (1997, p.277). He describes LK as the integrative framework that people in a particular setting use to make sense of their lives. It is a collection of ideas and assumptions that are used to guide, control and explain actions within a specific setting, based on a particular value system that includes religion and mythical beliefs.

3.4 Quantitative or qualitative?

After overcoming the terminology and definition debate I dived into yet another debate, which methods to use, quantitative or qualitative? This debate has proved to be the most important not only during the gestation stage of this research, but during fieldwork and especially during writing. As a trained natural scientist my first instinctive reaction was to apply the normal tools of the trade; words such as experimental design, control variables, theoretical models, hypothesis testing came to mind. My first idea was to quantify LK; the idea was to prepare two maps, a participatory one (with the community) and a geo-corrected one, using GIS. Then I thought I would run biological field surveys, measuring flora and fauna density, the abundance of commercial species and so on. When all the data had been analysed and incorporated to the GIS system, the two maps were to be *compared* to see if the community-participatory one offered accurate, reliable and a cheaper way to collect data and information! Looking retrospectively at this research idea, I was reducing knowledge to a convenient abstraction, bite-size chunks of information that could be slotted into and used in western science paradigms after its evaluation and verification. In this case I was using knowledge as another tool to gather data, after scientific proof and evaluation, an approach very similar to the Work Bank ideas about IK as practices that need to be scrutinised, "we need scientific proof, validation, evaluation"

(World-Bank 1998, p.6). Also I was trying to follow the steps of mangrove researchers such as Kovacs and Kaplowitz who applied quantitative analysis of qualitative data (see: Kovacs 1999, Kaplowitz 2000, Kovacs 2000, Kaplowitz 2001b, a).

After a thorough methodological review prompted by my supervisor, my failure to obtain a ESRC/NERC studentship[56] and my preliminary visit to the study area, I realised that the only way I could make a real transition from my natural science background, to human geography, and to become a real inter-disciplinary professional, was to learn other methods of research. I needed methods that would allow me to explore and understand processes and meanings, which I had somehow avoided during my natural science research. The timely publication of Steve Herbert on ethnography, where he argues that this methodology is underused in geography and that this neglect is specially injurious to the discipline because ethnography provides unreplicable insight into the process and meanings that sustained and motivated social groups (Herbert 2000, p.1), made me think about designing my research using ethnographic methods. Ethnography explores the fabric of everyday life, showing how social order is embedded in everyday activity and how meanings and discursive constructions of social life shape social action. Through ethnographic research I could begin to explore the processes and meanings of mangrove management and defence, and how these processes were reproduced and challenged, also this design would go perfectly with my empirical focus on LK. The end result of my methodological dilemma was to go and live full time for 12 months in the research area, working as part of the mangrove project[57] team, and collecting data using a mixture of techniques (see below section). Fieldwork was conducted between March 2002 and February 2003.

During my fieldwork I spent the time living among the mangrove communities and travelling to Quito and other parts of the country to participate in the meetings and activities of the mangrove defence movement. Whilst in the mangrove communities I shared all my time with the mangrove dwellers and I participated in all local activities including collecting shellfish, informal group conversations with the cockle gatherers and official meetings with external NGOs, authorities etc. Sharing everyday activities with

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[56] Joint interdisciplinary research studentships that encourage postgraduate research on environmental issues which were of interest to both Councils (launched in 1999).
[57] See chapter 5, section 3.3.2 for a brief description of the mangrove project.

local communities allowed me to better understand their relationship with the mangroves. It also allowed me to identify trends and issues that were later explored in the surveys, interviews and focus groups. This combination of research methods has resulted in more fruitful and significant data that is thoroughly culturally contextualised.

3.4.1 The research methods

The combination of LK research and ethnography offered me the possibility to apply mixed and eclectic participatory methods, from techniques that draw people in (participatory mapping, seasonal calendars, informal questioning, etc.) to more conventional paper and pen participatory surveys. My ethnographic work rested upon participant observation, a participation that became more and more intense as time went by (see section 3.4.3). As a guide for the survey, focus groups, semi-structured interviews and informal questioning, I followed the indigenous knowledge methodology proposed by Sillitoe *et al.* (2001) and the indigenous knowledge manual devised by the International Institute of Rural Reconstruction (IIRR 1996). During a 5 week preliminary visit to the area, and the first 4 weeks of my fieldwork, I conducted some informal interviews and initial focus groups to ensure that all concepts and terms used in the survey, interviews and informal questioning were culturally contextualized.

Socio-economic information was gathered using a socio-economic survey (SES). A total of 170 surveys and 100 semi-structured interviews were conducted in 12 different communities, including small, middle and large communities dispersed along the whole geographical range of the reserve (see figure 3.1). The SES included information on the different economic activities in the area and the uses of mangroves and other resources associated with mangroves (see annex I). Information regarding education, social organizations and migration was also included; each informant was asked a series of questions followed by a period of informal discussion about arc cockle gathering, fishing and the state of the mangrove resources in their community, and in the reserve in general. The semi-structured interviews and informal questioning were used to understand people's attitude and thoughts about mangrove defence, fishing and cockle gathering and the new management strategies (see annex II).

Figure 3.1 Ecuadorian coastal zone showing the location of REMACAM. The detail inset shows the communities where the socio-economic survey and interviews were carried out. The size of the communities is represented by the size of the dots. Urban towns (San Lorenzo and Limones) are depicted for information purposes only.

Living in the area and working with the mangrove project and later with C-CONDEM gave me access to their incredible amount of written documentation, from official reports, newspapers clippings to minutes of meetings. Also there was an extensive video and photographic collection, showing the development of the mangrove defence movement and the creation of the REMACAM. As Bechhofer and Paterson (2000, p.59) stated, the analysis of documents and other kinds of text and media material can be immensely rewarding and offer opportunities for imaginative analysis. The authors warn about the trade-offs involved in the analysis of such material. On one hand the researcher is not able to exercise any control over the way they are produced or what they contain, but on the other hand this material, unlike transcripts of interviews, are not the result of a highly complex and inevitably somewhat artificial process of interaction (Bechhofer& Paterson 2000, p.59).

In my case, the analysis of this type of material gave me the opportunity to understand the mangrove defence movement from a more objective, distanced point of view, using the newspaper clippings and recordings from television news and reports; also it allowed me to see the strategies used by the mangrove defence movement in their struggle against the shrimp farming industry in a more graphic way. Through this graphic and written archive I was able to see the movement's relationship with the government, and was able to carry out a detailed analysis of laws and legislations produced by the government, and to identify the government's position on mangrove management.

Having access to the 'written' history allowed me a sort of triangulation, the purpose of this triangulation however was not to check the different findings against each other, but rather to map out the general patterns and then through the other methods I could attempt to reveal the processes and meanings associated with mangrove management and defence. Knowing the history of the process in detail allowed me to interact better with the different social actors during informal questioning, semi-structured interviews and so on.

The analysis of written and graphic archives provided the main structure for chapters 6 and 7; however their reading and interpretation depends heavily on my work as a participant observer with the mangrove defence movement, the mangrove project and the in-depth interviews with the leaders and participants in the process.

3.4.2 Different social actors

During the course of the research I worked with, and approached different sets of actors. I have grouped them in 4 different groups, each group has some specific characteristics but, as will be analysed in chapter 7, section 7.3.1, some of them also belong to the other groups. This is especially the case for black activists and mangrove defence movement activists. However they had some unique characteristics that made them specific social actors. The groups are:

1. The mangrove communities, people that live in the rural mangrove islands (see full description in chapter 4, section 4.5.2)
2. The black activists, local members of the PCN and the local federations[58]
3. The mangrove defence activist, local and national members of C-CONDEM and FUNDECOL
4. The mangrove project, technicians working for the mangrove project, outsiders from Esmeraldas. University educated and mainly *mestizos*.

It is important to note that although the black activists were local members of the PCN, they are in fact currently the PCN leadership, in charge of all the PCN process at the national level. They travel extensively to the capital (Quito) and are in constant contact with the afro-Ecuadorian political institutions in Quito. The leaders live in San Lorenzo and Limones (semi-urban towns), and although the PCN have representatives in the mangrove communities, none of the present leaders live there. The majority of the leadership have high school degrees with some of them finishing university degrees when the research was conducted. The mangrove defence activists movement comprise all sorts of members; they have *voceros*[59] in each coastal province in the country. The central office is located in Quito, with another office in Muisne. A couple of people are permanently in Quito with the others travelling extensively between the coastal provinces and attending national and international meetings. Their executive committee is a mixture of black and *mestizo* activists with different levels of formal education.

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[58] Second tier-organization that groups grassroots groups and organizations in the area. For a more detailed analysis see chapter 7, section 7.3.1.1

[59] 'Spokesperson', literally mean the one with voice, they are representatives of grassroots groups in each coastal province.

There were two other types of groups that can be described as a sort of epistemic community. First the mangrove project *promotores*, mainly young people from some of the communities who work as the liaison between the mangrove project and the local mangrove communities. The majority have lived and studied in the bigger more urbanized areas (San Lorenzo, Limones, La Tola). They were chosen by the federations and as a pre-requisite they needed to have finished high school. They were paid by the mangrove project and were recipients of a very heavy training process, including short courses on ecology, pollution, climate change and legislation. Also, they were one of the main subjects of the communitarian education strategy (see chapter 7, section 7.3.2). The importance of this group can be more easily explained by the answer given by the mangrove project director, Edgar Lemos, to my question: why is the project investing in training the promoters:

> *"Training is the only element of the project that will survive after the project is gone. Educating the young people in the communities has been my priority and I believe that it is the only clear legacy we can leave here. With training they can become the voice of their communities. We are creating leaders here, we are giving them the tools to be able to defend the mangroves in the future and to be able to be the link between other projects and programs and the community"* (interviewed July, 2002).

The other group type I approached were particular external actors. Some of them are translating and implementing mangrove legislation, not only in the REMACAM, but also more widely in the country. Among this group I interviewed and related to were Ministry of Environment (MoE) officials, Congress people, the reserve officials and workers of other NGOs. Also I interviewed some prominent anthropologists and historians that have worked in the REMACAM area before (Santiago Paez, Nelson Reascos, Pablo Minda).

It is important here to explain the absence of the shrimp farmers as one of the actors in this study. Several reasons prevented me from working with the shrimp farmers. A basic one is their absence from the study area. As explained in section 2.6, shrimp farmers are normally absent from their farms, in the several shrimp farms I visited only an arm guard was found. The other more fundamental reason is the polarization of the shrimp-mangrove debate in the country. As explained in section 2.6.5 the relationship between the industry and the local communities has not been an easy one, bitter disputes and violence

have characterised this relationship. Therefore, mangrove activists see shrimp farmers as enemies so it is impossible to establish a dialogue with them if you have been talking to the shrimp farmers, and the same happens with the shrimp farmers -they will not talk to you if you have been talking with the mangrove activists. This distrust has been created not only for the difference in opinions but also the fact that several of the mangrove activists have been attacked and many of them have death threats on their heads. Under these conditions it was impossible for me to attempt to establish a dialogue with the shrimp farmers. The analysis of the shrimp farming industry presented in this thesis was carried out using secondary data such as newspaper clippings, video, government reports, and also CNA publications and webpage. The position of the industry was also analysed from their presentations in front of the Ecuadorian congress, especially during the presentation and analysis of the community proposed Mangrove Conservation Law (see section 7.3.4).

3.4.3 From observation to participation and back

Using Gold's suggestion that the roles of the researcher carrying out empirical research could be seen as ranging along a continuum (Gold, 1958 cited in: Bechhofer& Paterson 2000, p.92), Bechhofer and Paterson argue that this continuum runs from participation at one end, through to observation at the other via two intermediate points: the participant-as-observer and the observer-as-participant. In the fully participant end, the researcher is part of the situation, and indeed working covertly, so the others are not aware that the researcher is there to do research and will not have an influence on the events she/he is researching. At the opposite end, observation, there is no participation at all, this way the researchers will have very little impact on what happens. The participant-as-observer role is the one, according to the authors, where the researcher participates in the day-to-day life of the situation being studied, but it is known that she/he is carrying out research; the observation element is there, but not as prominent as in the case of observer-as-participant.

The question here is, where do I position myself in this continuum, and how did this position influence the events being studied? These questions became very relevant as fieldwork progressed. During my preliminary visit I visited the REMACAM area for the first time. I had a couple of names of people in San Lorenzo given to me by one of my friends who used to work in the area. Luckily for me one of the names was that of the leader of the PCN and the day I arrived in town they were having a big meeting with the

mangrove project team. I had some time with the director and told him about my research and previous experience in mangrove areas in neighbouring Colombia (my native country). He was interested in my research but most of all he was interested in my expertise as a marine biologist. This element was one of the most important factors in my relationship with the mangrove project. I was invited to visit the project offices and stay with them for the rest of my preliminary visit. With them I was able to visit all the mangrove communities and was invited to participate in a workshop they were running on black identity.

My first encounter could not have gone better; through this visit I was able to discuss my research ideas with the project team and the communities, also I was introduced to the leaders of the PCN. From this preliminary visit I realised that my research was going to be influenced by the people I was studying. As I explained before (section 3.2.1) the very name of my research changed due to this first encounter. Also, the elements of political mobilisation around the defence of mangroves and the creation of social organization against the shrimp farming industry were added after the preliminary visit; elements that became the core of my research. Here we can see how the research took, what Besio and Butz (2004, p.437) describe as an epistemological step beyond the 'native informant', creating a potentially fruitful basis from which to readdress some of the asymmetrical power relations that are normally generated during fieldwork.

From the beginning my relationship with the rest of the technicians in the mangrove project was very good; they identified me as one of themselves, and the director treated me as another of his technicians, with the added value for him that he did not need to pay me. He made sure I contributed with my knowledge and expertise to the project, and that I understood the project's different components. He also ensured that I explained to every body what my research was about. My first task, (during the preliminary visit), was to translate my preliminary research proposal into Spanish, leaving a printed copy, not only in the project office, but also in the federation's offices.

My first encounter with the intellectual part of the PCN ethnic movement was less successful. The person in charge of the black identity workshop, that the mangrove project was running during my visit, was the historian and black activist Juan Garcia, one of the most (if not the most) important intellectual founders of the Ecuadorian PCN.

During the 3 day workshop he clearly avoided and ignored me. I could not understand his attitude and asked the sociologist of the mangrove team whether I had done something wrong 'don't worry', she replied, he is like that to all *mestizos*, "he does not like us. He only talks to me because we are paying him to do this workshop, he is even having problems with the PCN leadership here, which is causing a rift between them, and is not our problem". I was concerned because I knew that he was one of the most important intellectuals of the PCN and was an expert in Afro-knowledge in the Esmeraldas region. He has spent more than 20 years collecting, what he calls, ancestral knowledge among the rural communities including the REMACAM. So, if I wanted to work on ancestral knowledge, he was the most important person to work with. His attitude towards me did not change during my fieldwork and he refused several times to be interviewed by me. Because his role in the PCN is almost non-existent now[60] and the foundations and proposals of the PCN can be found in some of the written documents of the federation and the PCN, to which I had access, this impasse did not affect my research greatly.

Here it is important to pause and reflect on Garcia's reluctance to participate in this research (or any other research that is not his own). Firstly, his rejection changed the way I approached the issues of ethnic identity and ancestral knowledge. As it is possible to find from reading this thesis, issues of ethnicity and identity are dealt with but they are not the central tenet of the research. Instead mangroves are the central tenet of the research and it is through mangroves I analysed the importance that ethnicity and identity have play in their defence. Second, as discuss in chapter 7, section 7.3, Garcia's public discourse about ancestral knowledge has been essential to the PCN environmental discourse, however his claims are contested by academics, NGO workers, scientist and even activists. Some said his claims are very intellectual and have never trickled down the local communities (see 7.3.1.2). His work is essentially seen as an intellectual discourse, a discourse that was very important for the vindication of the black movement, to make the black element visible to the Ecuadorian society and the international development organizations. His discourse was pivotal for the creation of the PCN and was used to claim their ethnicity credentials, especially during a time where ethnic affiliations and ethnic categories are fundamental to access international and development loans and aid. What is important is to understand

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[60] As will be explained in chapter 7, section 7.3.1.3 according to the new structure of the PCN only representatives of the grassroots groups can have a role in the PCN leadership, as historian/researcher Juan Garcia does not belong to a grassroots group, so is excluded from the PCN leadership.

that this discourse has not really trickled down to the local mangrove communities, it has stayed in the intellectual-development sphere. During my time with the mangrove communities I could not find any evidence of his ideas been used by them. Some of the PNC black activists identify themselves with the ideas but again these are not communicated down to the grassroots.

Happily my first encounter with members of the mangrove communities was totally opposite to the encounter with the intellectual head of the PCN. More than 20 inhabitants of the mangrove communities were part of the black identity workshop, so, as is normal in Latin America, after the theory comes the practice. The practice in this instance was dance. Fortunately we were on the border with Colombia where the most popular music is salsa, so several hours were spent dancing and singing with my fellow workshop assistants. From my previous experience working with mangrove communities in Colombia I knew how important it is for community members to establish a social link with the people they work with. The communities of the REMACAM were no different. For them, the fact that I spent these hours with them sharing social experiences, showed them that I liked and respected them. I remembered how the lack of understanding of this basic rule made my life very difficult when as a young marine biologist I first did research with coastal fishermen in Colombia. I was told I should be distant and not mix socially with the fishermen in order to avoid problems. My aloofness created an atmosphere of mistrust making my work much more difficult. Fortunately I have learned from that lesson. Another aspect that helped in my relationship with the mangrove communities was my previous experience of working and living in mangrove area conditions. The mangrove environment was not alien to me and I could understand the tides, row in the '*potros*[61]', climb the mangrove roots, walk in the mud, things that, believe me, are not easy for the new-comer. The female cockle-gatherers loved to hear about those in Colombia, and to hear that the species of cockles and mangroves were the same. This knowledge somehow made me one of them in their eyes. For me this was the best possible outcome as I was very aware of the asymmetrical power relationship and the potential hierarchical dichotomies that arise when somebody like me works with rural women on low incomes, in developing countries. Wealth, education, freedom of movement and ethnicity shapes the

[61] Small wooden canoes use in the area, '*potro*' literally means water horse

relationship between the researcher and those to be researched. My gender, nationality[62] and experience working in the mangrove environment made these asymmetries much easier to negotiate. Also the fact that I was working as part of the mangrove project made my access to the communities so much easier.

Access to the other two groups, (PCN activists and the mangrove defence movement) came later, and were facilitated by technology. It will be explained in chapter 7, section 7.3.3 how the mangrove project works hand in hand with the local federations (FEDARPOM and FEDARPROBIM). The federations are comprised of all the grassroots groups in the area and are at the same time the PCN representatives. The PCN leadership can be described as suspicious and wary of foreign, *mestizo* researchers. When dealing with them as a federation, I did not have any problems in gaining access to their information and meetings (which are normally conducted in the mangrove project offices or with the help of the mangrove project). Also socially they treated me very well. When it came to their special meetings as the PCN [the ethnic movement], however access was restricted for all technicians and *mestizos*. My breakthrough with them came from the most unlikely source, my portable computer. I was asked by the PCN leader to be in their most important meeting (the *Parlamento*, see chapter 7, section 7.3.1) taking computer notes to make a digital memory of the event. I was the only non Afro-Ecuadorian in the meeting and from that moment on I was invited to the majority of their events[63]. Later they also asked for my help with some of their proposals, especially designing the curriculum for a new leader's school.

My portable computer again played a very important role in my relationship with the mangrove defence activists. The executive secretary called the mangrove project director because they needed somebody to prepare the digital memory of a very important meeting they were having. The director looked at me and said, I have the right person with the right equipment in front of me, so that day I packed and went to Muisne, where I met not only all the members of C-CONDEM and FUNDECOL, but also the Congress commission that would later be in charge of presenting the new mangrove communitarian law (see chapter

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[62] The majority people in the REMACAM communities have blood or friendship ties with Colombia. So, Colombians are not seen as foreigners in the region.

[63] Sensitive information from the PCN meetings has not been used in this thesis. I was given permission to use some of the information from the *Parlamento* (chapter 7, section 7.3.1.3 and 7.3.2). Other PCN information used such as the ethno-education proposal is part of their written documents and is in the public domain.

7, section 7.3.4). This encounter initiated a very fruitful and rewarding relationship with the mangrove defence activists. As the mangrove project director, C-CONDEM quickly realised they could use my expertise as marine biologist and my credentials as an external academic to help them to be heard by the government. I was invited to the meetings with the Congress, the minister of environment and have produced expert reports to show the importance of the mangrove ecosystem and why it should be protected. It is important to note that my personal and collaborative relationship with C-CONDEM still continues today and we are currently in the process of presenting an international proposal to the EU[64].

My encounter with the mangrove defence movement shifted part of the focus of my research. As Okely (1994, p.20) points out, to the professional positivist these encounters seem like chaos, but for me this helped to make sense of the wider patterns at stake and to understand the processes that undergird social actions. It also helped me to connect global and local spaces, to see how the development of neo-liberal industries are not only increasing social exclusion and changing traditional mangrove use and management in the REMACAM but have also given rise to a new social actor. This new social actor is not isolated but rather as shown in chapter 2, section 2.7.2, is an actor that has been able to transcend its locality to become part of a global resistance movement.

This encounter also made me engage and reflect upon my own positionality during the research period and how my involvement and experiences are an integral part of the research. As Butz and Besio (2004, p.358) point out, we need to come to terms (methodologically and analytically) with the fact that we become part of our subject's social world, and that this is reflected in what becomes of our data.

Traditional research method textbooks advise against conducting research in something you are emotionally involved with in some way, on the basis that this will minimize the supposed objectivity of the study. Conversely however, it has also been argued that a close and equal relationship to the research can actually lead to an acquisition of more fruitful and significant data. In my research context, as Nicole Westmarland (2001, p.8) argues, I found that rather than hindering the research process this downplayed

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[64] This new proposal is a direct development from the work presented in this thesis.

my academic status, resulting in a more relaxed environment, balancing the power relationships.

Also helping my research subjects I felt that my research became less extractive in nature and more mutually beneficial for groups that otherwise would be treated only as subjects in a research project. As Butz and Besio (2004, p.358) argue, we need to find ways to support our research participants' projects of self-representation and self-determination if we are going to develop a specifically postcolonial research practice that intends to dismantle the lingering effects of colonial discourses and structures of domination.

I want to finish this section with Monica Colombo's (2003, p.1) reflection that knowledge is not sustained by its correspondence to an objective reality, but rather is inherently constructed and sustained by social processes, or, in other words, by communal practices. As Vivien Burr argues, objectivity is:

> *"an impossibility, since each of us, of necessity, must encounter the world from some perspective or other (from where we stand) and the questions we come to ask about that world, our theories and hypotheses, must also of necessity arise from the assumptions that are embedded in our perspective (...) The task of researchers therefore becomes to acknowledge and even to work with their own intrinsic involvement in the research process and the part this plays in the results that are produced. Researchers must view the research process as necessarily a co-production between themselves and the people they are researching"* (Vivien Burr, 1995:160 cited in: Colombo 2003, p.2).

3.4.4 Lost in data

The length of the fieldwork together with the close interaction with the social actors produced literally what could be described as a sea of words and data. The SES and semi-structured interviews were dutifully input into ACESS databases, with questions grouped into different categories and each category in a different table. Each record received a code depending on the community; all tables used the code record as a primary key, so tables and records could be cross-tabulated for analysis. Additionally, two other databases were created containing information on all grassroots groups found in the area and another

containing census data of all the REMACAM communities. A participant observation diary was kept and included the archives of all meetings I participated in, notes on the informal talks with community members, PCN and federation leaders, technicians and some specific cases. These files were all kept in digital format as word documents. I also kept a memo note-book where I wrote embryonic analytical concepts of the situations I encountered, questions, deductions and reflections about the different activities I witnessed or participated in. After coming back from my fieldwork I did a summary of the empirical data produced during fieldwork (see annex III) and showed it to my supervisor, her first words were: this is a lot, you have data here for at least 3 theses! I never believed her, only now I do realise, that yes, I collected a lot of data.

The problem with collecting a lot of data is that you get overwhelmed by it, especially if you want to slot it into pre-determined categories of analysis or chapter structures. I think that this was my major error: I wanted the data to fit into my structure. I forgot that during my fieldwork I was flexible, using an open-ended approach, flowing with the situations. I forgot the dynamism of my research process. Looking back I think I became trapped in what Hughes (1994, p.41), calls the idea of the 'original' PhD, the idea that a PhD needs to be an original contribution to knowledge. Also I was too focussed on the original ideas I had about my research questions, without looking at the patterns and priorities that arose during the fieldwork. As a result I was paralysed and literally lost in my sea of data. Reflecting back on this stage of the research I argue that these difficulties emerged from the practical problems of doing interdisciplinary research, transiting from one discipline to another is a hard enterprise, especially if one is seriously involved (as I am) in overcoming theoretical affiliations and building common bodies of knowledge and practice. It is never easy to leave the well trodden path.

My supervisor suggested putting some distance between me and the data, so I went to teach fulltime; I taught Latin American development and social movements. This teaching not only took me away from my data for some months but allowed me to explore new literature that took me beyond my research boundaries. In doing so I found a new awareness that allowed me to return to my field data with fresh visions. As Hughes (1994:39) points out, immersion in the field leaves one almost too close to the data themselves to make any broader sense of them. Also the deep personal relationship with the research participants and the research subject itself can lead to dangers of over-

identification. Going away and exploring other fields made me try to explore other ways of writing my data, which brought together key ideas that I was over-looking in my attempt to make the data fit into a pre-conceived structure. Using the concepts of grounded theory I immersed myself in the data, searching out patterns, identifying possible phenomena and divergent views offered by my different social actors. I started coding and categorising. As Bryman and Burgess (1994, p.4) argue the codes are the building blocks for emergent rather than pre-specified concepts. Some of the codes I used were descriptive and others interpretative. With this process I narrowed down the focus and went back to my embryonic analytical concepts from my fieldwork memo. What is really interesting is, that some of the emerging themes and concepts from my data were similar to some of my embryonic concepts. For example, I realised that my idea about the insider/outsider perspective of the mangroves (see chapter 6, section 6.2.1) was a recurring concept in my fieldwork memo. I could follow these themes and concepts not only in my data but also in the written and graphic sources I have access too.

The end result, which I am presenting here, draws on the totality of the research experience and my personal journey exploring interdisciplinarity, overcoming the cognitive constraints of learning a second discipline, appropriating and accommodating methodologies and languages, and facing new priorities, criteria and referents. This research I trust is not just a juxtaposition of monodisciplinary ideas and methods, but a new, unique view of the complexities of social, political and economic changes that arise from the introduction of neo-liberal industries and reforms in developing countries. I also hope that it is a new insight into the processes and meanings about mangrove management and defence, the use and politization of local knowledge, and a new understanding of how global processes have shaped local spaces, thus giving rise to new social actors.

Chapter 4 - Introducing mangroves and the study area

4.1 Introduction

Very few activities in the REMACAM area can be imagined without the mangroves. During the high waters, estuaries and creeks cushion the waves, allowing people to navigate to very distant places in their small "water horses" (*potros*), a task that would be impossible in the rough open sea. During the low water mangrove roots and trees provide cockles, molluscs and crabs for the daily meal. The infinite numbers of organisms mangroves support form the first step in the complex food chain of the Pacific coast. Producing the food for fish and shrimp; the canopy gives shadow and refuge allowing the small larvae to hide and survive, before going to the open sea to feed the hungry fishing boats. From the trunks and branches people obtain building poles, tannins and firewood and from their roots they can make vegetable charcoal. Thus, mangroves produce all the basic things the people need, refuge, wood and protein. Without the cockles and crabs that live in the mud many households would not survive. Without "mangrove cushion", beaches would erode, and agricultural land will become salty. Without mangrove organic matter and refuge, offshore fisheries would perish. And without this amazing ecosystem the mangrove-people would not exist.

The soft mud of the mangrove is bluish-black, composed of sediment particles rich in decomposed organic matter. This material is trapped in a mud that is poor in oxygen, inside which there is great activity of anaerobic bacteria, producing the hydrogen sulphur that gives this mud its characteristic smell (von Prahl 1990). Along the estuaries' edges, where the sediment deposits are continually renovated by the river waters, the mud is very soft, this softness allows many animals to thrive and grow: fish, crabs and molluscs.

Without the great number of rivers flowing into the coastal area and an infinite number of estuaries, this mud, which is rich in clay and organic matter, would not be deposited. At the same time, if during every six hours the sea level did not change, the mud would become very hard and would not allow the viviparous mangrove seeds to set and neither would it be able to support the molluscs and crabs that lie in the mud's interior. This life theatre would not be possible without the permanent changes in the water's salinity, nor if the temperatures were to fall lower than 20 °C, or, the waves were so strong

that the mangrove seeds were taken away from the coast. This system is therefore, highly complex and fragile.

However, as analysed in chapter 2 (section 2.3.1.1), this beauty and complexity has not been understood and mangroves have been destroyed around the world. In this chapter I will introduce the complexities of the mangrove ecosystems and the relationship between mangroves and their dwellers. The aim of this chapter is to introduce mangrove ecology, to show how this ecology has played a central role in shaping human-mangrove dynamics, and has also played an active role in the formation of discourses and narratives around it. Section 4.2 will present an ecological definition of the mangrove ecosystem, followed by a brief introduction to mangrove ecology and biology. Section 4.3 will explore the key role mangroves play in the initial settling of gathering and fishing communities, the importance of mangroves for pre-Columbian people, and how the relationship mangrove-humans changed during the colonial period. I will also discuss how the Spanish perception not only survived after independence but shaped the way mangroves have been used and managed in Colombia and Ecuador. Section 4.4 will describe how the communities use a time management framework based on the tides and how they have adapted their life and work practices to tidal patterns.

Section 4.5 will provide a description of the study area and the mangrove community's social and economic characteristics. The last part of the section 4.5.3 will describe the different mangrove species found in the REMACAM, as they have provided the basis for the legal definition of mangroves proposed to the government by the C-CONDEM. The section will also show how local communities have a very specific knowledge about the mangrove species and recognised subtle differences among them.

The aim of this chapter is to show the complexity of the mangrove ecosystem and how its inhabitants have adapted to live in them. It also presents some ideas about how the outsider and insider perspective have emerged historically. These understandings will allow us to comprehend the arguments on cultural representations and conceptualizations that are introduce and analyse in chapter 6.

4.2 Defining mangrove as a biological and ecological ecosystem

4.2.1 Mangrove definition

Elizabeth Farnsworth (1999) introduces her "forgotten forest" article by explaining that mangroves are not mangoes. Yes, mangroves are not mangoes; they are a highly productive coastal ecosystem that develops in low energy depositional environments (river deltas, lagoons, estuaries) in exposed and sheltered shorelines in tropical areas. According to biologists and ecologists, the term "mangrove" embraces two different concepts. One refers to the halophytic species of shrub and trees belonging to different plant families, which vary in their dependence upon littoral habitats. The common characteristics of these species are that they are adapted to extreme environmental conditions: high salinity, alternating water saturation and desiccation, fluid mud and unstable substrata. To cope with these, the individual species have developed several strategies. Salt glands to tolerate salt, varied root structures like prop (stilt) roots and pneumatophores to growth in fluid mud and unstable substrata. Together with aerial roots and breathing roots to interchange gas in aerobic substrates and the production of floating, viviparous (germinating) seeds that can be transported and dispersed by water. Many species and families share these characteristics and are known as mangroves (see figure 4.1).

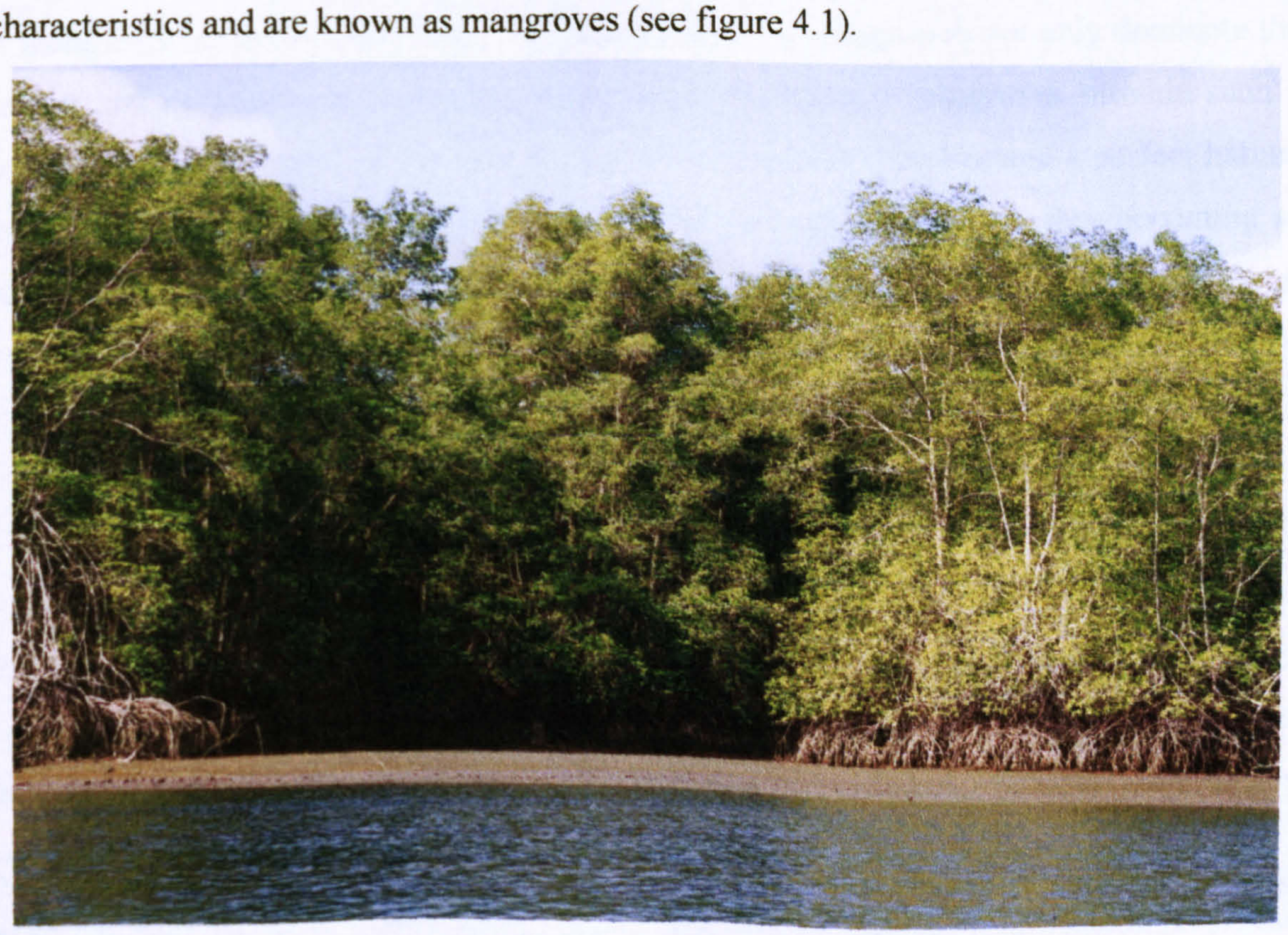

Figure 4.1 Mangrvoes in the REMACAM area

The second definition of the term encompasses the entire plant community, including individual mangrove species, which occur in tropical and subtropical sheltered coastlines. They are populated by a vast number of fish, crustacean and molluscs (some of them are the base for important offshore fisheries) vertebrate and invertebrate species, most of them of economic importance. As such mangroves are an entire ecological ecosystem that provides many goods and services of great importance to human societies. Some of the synonymous terms used to describe the entire ecosystem include 'coastal woodland', 'tidal forest', and 'mangrove forest'.

The debate over mangrove definitions is a difficult one, as the first concept shows there are authors who are inclined to view mangroves as trees, using the floristic composition as the basis of their definition. Other authors argue that the mangrove ecosystem is a more complex affair and that mangroves should be considered as an "integrated ecological unit" with flora and fauna component, and with specific adaptations closely related to the specificities of the mangrove environment. Neither of these two concepts mentions a key component of the mangrove ecosystem. The mangrove dwellers, people who for centuries have adapted and lived there and who play a very important role in mangrove use and conservation. My argument is that mangroves not only dominate the habitat and constitute an ecological ecosystem, but, because mangroves provide such a wide spectrum of resources for diverse types of extraction, they become a perfect habitat for human beings, who can live in the mangroves and use its resources, thus becoming an integral part of the mangrove ecosystem. As such, humans adapt to the mangroves, interacting and forming specific relationships and becoming ecosystem people[65]. So, we need to see mangrove dwellers as an integral part of the mangrove ecosystem (part of the ecological unit), not simply as an external actor which exploits the mangrove resources. This argument differs from the perception among researchers and "development workers" who view mangroves only as a "resource base" for mangrove dwellers. Authors like Burbridge (1991) define mangroves as a resource ecosystem, implying that mangroves are only of economical use for dwellers. My argument is that mangrove-human interaction is far more complex than just an extractive relationship; mangrove habitats have shaped

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[65] People who "lived within one ecosystem or, at most, a few closely related ecosystems, that depend entirely on the continued functioning of those ecosystems for their survival." Traditionally, ecosystem people have established intimate, complex relationships between their culture and nature which assure that an individual's economic interests need not jeopardize the health of the surrounding environment. Ecosystem people worship the Earth as the basis of life (Dasmann 1976, Gadgil 1993).

communities making them entirely dependent upon them. As a result, mangrove dwellers see mangroves as an integral part of their lives and the external pressures are what make them jeopardize the ecosystem. To thoroughly evaluate the importance of mangroves for society requires insight into the flow of products and services within the social system of coastal communities, and an understanding of how they are linked and influenced by domestic and international markets and institutions.

To be able to administer and sustainably use mangrove ecosystems, we need to have an holistic approach, identifying not only the biological and ecological functions of the ecosystem but also the social and cultural functions and the role it plays in the survival of coastal communities. We need to see mangroves, not just as trees and animals, but as a complex ecosystem where human beings are an integral part that not only depend upon them, but at the same time, can make a difference to mangrove survival.

4.2.2 Mangrove Ecology and Biology

In ecological terms, mangroves are defined as open systems; they use the nutritional elements brought both by continental and sea waters (Cintron& Schaeffer-Novelli 1984). They transform solar energy into organic matter that is then exported to other ecosystems[66]. Falling leaves, flowers and bark constitute the basis of the mangrove food web, which is based largely on the release of nutrients from the decomposition of mangrove leaves, and in part on the trapping of terrestrial material. The organic matter exported into the coastal zone stimulates coastal productivity and increases off-shore fishery production, (Matthes& Kapetsky 1988, Rönnbäck 1999, For reviews see: Barbier 2000, Sheridan& Hays 2003). Mangroves have been widely demonstrated to provide food, shelter, refuge and breeding grounds for harvestable fish, shrimp, shell-fish and other marine organisms. These functions have always been used by researchers and conservationists as a key element in showing the importance of mangrove ecosystems. Several authors, (D'Croz& Kwiecinski 1980, von Prahl 1980, Turner 1989), have all shown the positive contributions of mangroves to the off-shore fisheries on the South American Pacific coast and the important role mangroves play in the development of commercial shrimp species[67].

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[66] In contrast to closed systems like tropical rainforests, where the energy produced is not exported, and rather stays in the same place.

[67] The basis of this relationship seems to be that mangroves provide (a) an extensive three dimensional environment for fish and shellfish, especially in the juvenile stages (i.e. a nursery habitat); and (b) detritus

As shown in chapter 2, section 6.4, the Ecuador shrimp farming industry is heavily dependent on the wild-post larvae from the mangrove areas. According to Twilley, *et al.* (1993), the role played by the mangrove ecosystem in the life cycle of shrimp is believed to be the most valuable ecological service provided by Ecuador's mangroves. Parks and Bonifaz (1994) show how due to the destruction of mangroves, wild post-larvae became scarce and contributed to the decline of the shrimp mariculture in the early 1990s.

Mangrove aerial and prop roots serve not only as habitat and refuge for other animals, but they also act as sediment traps, helping to stabilize sediments, preventing and reducing coastal erosion, buffering the shore from storm waves and protecting communities and shore-line activities. At the same time, they create new topsoil and maintain fertility. Roots trap pollutants associated with terrestrial runoff acting as a pollutants sink for dissolved and suspended substances, which are then removed from the water by sedimentation and as uptake by organisms attached to the roots. In this way, fertilizer, pesticide and sewage can be removed (Gilbert& Janssen 1998). Mangroves also act as a natural barrier avoiding salt water intrusion (salinization) into agricultural land and replenishing groundwater tables.

The above ecological functions and services are among other life supporting functions of the mangrove ecosystem which include oxygen production, local climate balance and water catchments[68]. All these ecological services and functions do not have a market economic value, so they are generally underestimated and overlooked by government officials, planners and developers when decisions about converting mangroves are taken. However, as will be explained in chapter 5 (section 2), local communities in the REMACAM perceive and understand very well the natural functions of the mangroves and as chapter 6 will show, they are part of the insider perspective local communities have of their mangrove ecosystems.

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exported from mangroves provides a major energy source in tropical coastal waters to support high productivity in food chains involving large numbers of detritus-feeding species, such as mullets and penaeid shrimp. Many high value, commercially exploited fish and shellfish utilize mangroves during part of their life cycles, including white shrimp (*Penaeus merguiensis, P. indicus, P. vannemei*), groupers (*Epinephelus tauvina*), sea-perch (*Lates calcarifer*), mud crab (*Scylla serrata*), milkfish (*Chanos chanos*) and mullets (*Liza* spp.) (Rönnbäck 1999).

[68] Biophysical support to other coastal ecosystems, Biological regulation of ecosystem processes, Maintenance of biodiversity and genetic resources, sink for carbon dioxide, ground-water recharge (Rönnbäck, 1999:236)

4.3 Mangroves and people

This section will present some of the archaeological evidence that shows us the important role that mangroves have played in the survival of American Pacific coastal communities from pre-Columbian times. Especially important is the evidence that the mangroves located in the deltaic complex Mataje-Santiago-Cayapas (which today constitutes the REMACAM) have been inhabited for hundreds of years, and this area gave birth to one of the most advanced cultures in the Americas. The other notable aspect is that the REMACAM mangroves are not isolated; they belong to an ecological and cultural complex that extends from the Guapi area in Colombia to the Muisne area in Ecuador. This historical context allows us to understand why the links and relationships between the REMACAM communities and the Colombian communities are much stronger than with those Ecuadorians from the sierra. This is an important element for the PCN and has played a decisive role in the formation of the REMACAM communities; it has given them a different national and identity perspective. For the communities in the REMACAM the border between Ecuador and Colombia does not exist, they see themselves as part of a wider space where mangroves, history and race play very important roles.

Section 3.2 will describe what happened to the mangroves with the arrival of the Spaniards to the Americas. It will show how the Spanish did not have a favourable view of the mangrove area but when they discovered the quality of mangrove timber, they started a massive exportation from the Colombia-Ecuador mangrove region to other countries in Latin America; this way of exploiting mangroves not only survived after the independence, but shaped the way mangroves were used and managed subsequently in Colombia and Ecuador.

4.3.1 Mangroves and pre-Columbian people

Mangroves have been widely and variously used by coastal people of the tropics for thousand of years. In different countries of the American continent, there is strong archaeological evidence of mangrove utilisation by Pre-Columbian and even Pre-historical human groups. Authors like Castaño-Uribe (1990), argue that the expansion of mangrove forests in tropical coastal areas, around 6,000 years ago, probably triggered important social changes among itinerant human groups, specifically, inducing an initial settling process of gathering, fishing, and hunting communities.

Nomadic human groups frequently formed semi-permanent settlements along the coast close to lagoons and bays, where an abundant and easy to collect, protein-rich diet was provided by molluscs, (Reichel-Dolmatoff 1965). In these areas they left large amounts of shells, organic and "cultural" debris, called "*conchales*", or "concheros" in Spanish speaking countries and "*sambaquis*" in Brazil. These remains provided important information on the characteristics of these populations, including food habits and utilisation of natural resources (Perdomo-Rojas 1978, Reichel-Dolmatoff 1985, von Prahl 1990). Pre-Columbian inhabitants traditionally used mangroves for many purposes, including wood for shelter construction, fuel wood, elaboration of fishing devices, medicinal substances and the associated fauna as a primary source of animal protein (Lacerda *et al.* 1993).

Along the extensive mangrove fringes of the American Pacific and Caribbean, this developmental process resulted in distinct patterns of cultural adaptation which are still present today. For these communities, mangroves represented their support resource, therefore their interaction was very important (Castaño-Uribe, 1990).

In South America, the Pacific coast cultural adaptation was greater and more complex than that of the Caribbean coast. Different settlement patterns have been documented with dispersed groups of fishermen and gatherers in Guapi, Sanquianga and Isuandé (Castaño-Uribe, 1990). But the most important group was the one that developed in the Tumaco[69] area, a pre-Columbian culture that reached a high technological and social development (Bouchard 1981). A clear example of the relationship between this culture and the flood coastal zone and mangrove swamps, was their habit of constructing artificial palisades known as "*tolas*", to protect their houses from excessive humidity. This is one of the clear examples of how the first inhabitants adapted their life styles to the coastal lagoons and flooding mangrove areas.

Their culture is known as "La Tolita" (Bouchard 1983), and their centre was founded in what is still known as "La Tolita Pampa de Oro", a community in the middle of the REMACAM area. According to Bouchard (1986) it is possible to recognise the mixed economies (fishing/agriculture) of the groups in the Guapi-Mataje complex, where the

[69] A few miles north of the REMACAM reserve, belongs to Colombia, but is part of the same cultural and ecological mangrove system.

basic products were fish, crabs and molluscs (especially *Anadara tuberculosa*) and the agriculture of corn and tuberous roots. He also states that, in the region between Guapi (Colombia) and Muisne Esmeraldas province (Ecuador) the same cultural and historic processes determined by *époques*, periods and phases are all connected spatiality, were lived.

Life near the sea, and the coastal resources used, were the principal subjects of the functional and decorative ceramics of *Tumaco* culture. A wide range of associated mangrove fauna is reflected in the zoomorphic representations found during excavations. These included, turtles, crocodiles, birds, estuarine fishes and fishing devices such as weights for fishing nets, and golden fish hooks (Prahl, *et al.* 1990). During my visits to the Tolita Pampa de Oro community, I also found some remains of these ceramics.

Another aspect is the role played by the mangrove area between Tumaco (Colombia) and Tumbes (Peru) in the trade along the Pacific coast. Castaño-Uribe (1990) states that there is evidence that 900 years A.D, a network of trade and fishing ports developed in the region using mangrove areas as sources for raw materials. Big rafts made of *Ochroma* wood (balsa) travelled daily long distances with several types of goods, among them shells from the Chile. In the 1600s the Spanish reportedly sailed rafts with 30 tons of goods along the Colombia-Ecuador border (Rueda-Novoa 2001a).

At the time of the arrival of the Spaniards to the new continent, it is known that several ethnic groups inhabited the mangrove areas between Colombia and Ecuador. Even though there is little information about the area to specifically characterize and mappe the different ethnic groups, there is a consensus that they were of an eminently aquatic culture, connected by maritime trade and extending from Panama to Ecuador (Rueda-Novoa 2001b). The next section will show that with the arrival of the Spanish conquerors conditions changed, here, as everywhere else in the Americas, similar to what happen in the other territories, mangroves were conquered and exploited.

4.3.2 The mangrove conquest

Historians argue that the coastal area of the Esmeraldas province were the first to be recognised by the Spanish conqueror Vasco Nuñez de Balboa in 1525 or 1526 (Savoia 1992). There is also some evidence that in his second trip to Peru (1525-1526), Francisco

Pizarro landed in one of the bays and explored the area (Whitten 1997) and that during colonial times this area was a calling port in the navigational route from Panama to Peru.

However, the Spanish view of the mangroves was not a favourable one. In their narrations they describe mangroves as an impenetrable, inhospitable, unhealthy world plagued with fetid swamps and mosquitoes (von Prahl 1990). For them, mangroves just represented a "nuisance for the troops and the horses and the most difficult land of the new reign". It seems that the invaders Pizarro and Almagro went through many difficulties, in what is now Colombian/Ecuador Pacific due to "the flooding land covered with mangroves" (Cristobal de Molina, 1552 cited in Prahl, 1990:31). Besides undervaluing the ecosystem, the Spaniards began the exploitation of the natural resources when they discovered the quality of mangrove timber for construction, especially for poles and boat building. Since the sixteenth century, the exporting of mangrove wood from the Colombian Pacific to Lima (Peru) is very well documented; this practice was continued until the second half of the eighteenth century, when it reached 6,000 poles a year[70] (Prahl, 1990).

The Spaniards perception of mangrove ecosystems made its exploitation an unrestrained one. Management or control was not imposed in the Latin America mangrove exploitation. The only example of management in Latin America was the edict enacted by Don José, King of Portugal, in 1760, making unlawful the felling of mangrove trees for firewood without the utilisation of bark. The reason behind this edict, was the increase in the price of bark for the tanneries, due to the widespread felling of mangrove trees for firewood in the *Capitanias* of Rio de Janeiro, Pernambuco, Santos, Paraiba, Rios Grande, and Cearz in Brazil (Hamilton& Snedaker 1984).

The colonial way of perceiving and exploiting mangroves survived after the independence. For example D'Croz (1993) reports how in the first half of the 19th century in Panama, mangroves were declared as highly dangerous for heath, as they were the home of mosquitoes, malaria and other diseases and additionally non-productive land. An important example of the uncontrolled exploitation of mangroves is the large scale

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[70] There is no reliable information about the amount of mangrove wood exported to Peru from the Ecuadorian coast, but there is anecdotal evidence of the use of mangrove wood in Guayaquil for buildings, telegraphic posts and railway sleepers.

exploitation of its bark for tannin production[71] during the second half of the 20th century. The activity reached its height between 1952 and 1968. In Colombia, for example, 30.000 tons of bark per year were produced. Bark was striped from felled mature trees, leaving remaining wood unused. Studies by the National Institute of Natural Resources in Colombia and Reid Collins, (INDERENA& Reid-Collins 1976), showed, that to get one ton of bark 10 m^3 of wood were wasted. This means that between 1952 and 1968 at least 300.000 m^3 of wood per year were being laid wast in the Pacific coast of Colombia alone. Even though there is no statistical information for the amount of bark produced by the Ecuadorian mangroves, Labastida (1995) reported anecdotal accounts from older local people, who remember how large numbers of bark-stripped mangrove trees rotted in the area, while the bark was taken in big boats to Brazil. So we can easily assume that the wastage of mangrove wood was very similar to the one in Colombia. There are also some interesting observations made to corroborate this information, according to Whitten, (1992), between 1963 and 1965 the mangroves in the Esmeraldas province were decimated to produce bark. After 1968, the bark exploitation stopped due to the collapse of world markets, that almost eliminated tannin production activities in South America, (Snedaker 1986).

This uncontrolled exploitation is a clear example of how the mangrove forest has been perceived since colonial times. We can argue that mangroves have been badly used due to the old (Spanish) perception that mangroves are muddy, mosquito ridden lands that are difficult to access. It is possible to see here how this view survived after the independence and, as will be analysed in chapter 6 (section 6.2), has become what I call the outsider perspective. A perspective that has shaped the way mangroves are managed and administered in the country.

4.4 Mangroves, tides and people

The specific characteristics of mangrove ecosystems, such as their development in the inter-tidal zone, have created special adaptations among its inhabitants. One of the most important is the understanding and adaptation to tides and tidal patterns. In this section I will introduce the tides and the tidal patterns in the study area and show how local communities have accordingly adapted their life style and work practices. I will show how

[71] Bark in the Rhizophora spp, contains 50 to 60% of tannin acid that was used in the leather industry.

tidal conditions have created a specific time management governed by the tidal rhythm and the moon, which is not always understood by outsiders coming into the communities.

4.4.1 The daily tide

To understand life in the mangrove communities, we need to understand tides. Tides define the life in the coastal communities where they have adapted to them and tides dictate when they go cockling, or fishing and when they travel, etc.

Tides[72] are governed by the lunar day, so in places like the REMACAM where the tides are semidiurnal (see Fig. 4.2). There are two high and two low tides at approximately six hours every 24 hours and 50 minutes (a lunar day), so each day low and high tides happen at a different solar hour. The tidal range in the REMACAM is on average 3.5 meters with a maximum of 5.2 m. The tidal current can be very high depending on the area in which you are located; in narrow channels and inlets it can reach several kilometres per hour. All these characteristics influence fishing and travel activities in the mangrove communities.

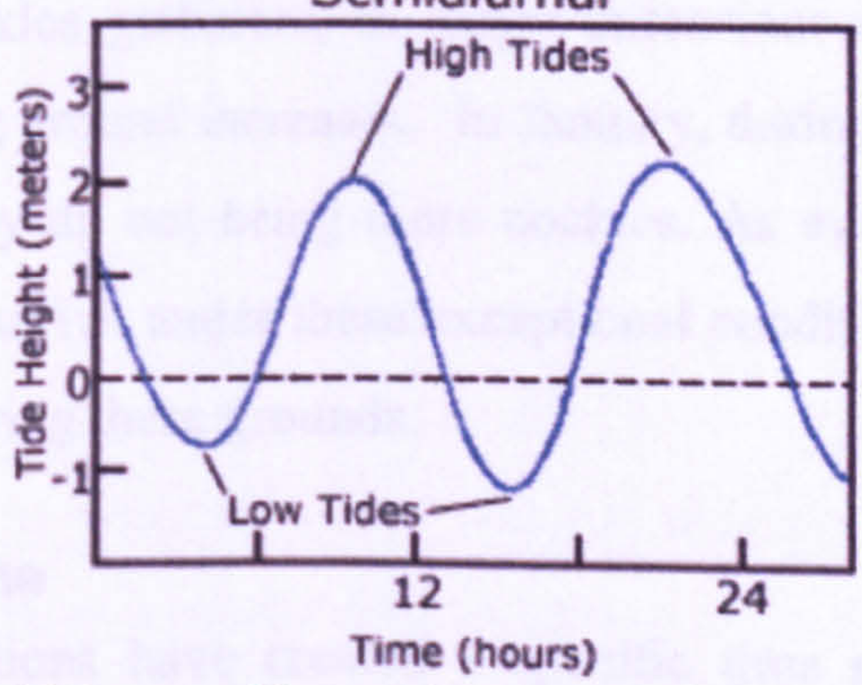

Figure 4.2 The tidal wave illustrating low and high tides (Source: NOAA n.d)

4.4.2 Tidal patterns (*pujas y quiebras*)

The tidal pattern is not the same throughout the month. Although the moon is the major influence on tides, solar tides are about half as large as lunar tides, thereby introducing a variation in the lunar tides patterns. At the time of the new and the full moon, (when the sun, moon, and earth are in alignment) the solar tides have an additional

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[72] Tides are very long-period waves that move through the oceans in response to the forces exerted by the moon and sun. Tides originate in the oceans and progress toward the coastlines where they appear as the regular rise and fall of the sea surface. When the highest part, or crest of the wave reaches a particular location, high tide occurs; low tide corresponds to the lowest part of the wave, or its trough. The difference in height between the high tide and the low tide is called the tidal range and the horizontal movement of water which often accompanies the rising and falling of the tide, is known as the tidal current.

effect on the lunar tide creating greater high tides and very small, low tides. This phenomenon is called spring tide; along the Colombia and Ecuadorian Pacific coast it is known as *puja*. The following week, when the sun and moon are at angles, the solar tide partially cancels out the lunar tide, producing moderate tides known as neap tides, the locals call it *quiebra*. So every lunar month there are two sets of spring tides and two sets of neap tides.

Another interesting phenomenon occurs every year, in January. When the earth is closest to the sun the tidal range is enhanced. The opposite occurs in July when the earth is furthest from the sun, tidal ranges are reduced, thus producing an exceptional spring tide with an exceptional tidal range (known as *el aguaje:* the big water) and an exceptional neap tide in July where the tidal range decreases substantially. Even though the communities are aware of this latter phenomenon they do not have a specific name for it. *El aguaje* is very important as it sets the maximum level of water in each area, thereby defining the height of the stilts for houses and piers or the place where houses can be built.

The *pujas* and *quiebras* are also very important for the cockle gatherers; the *pujas* are the best time for cockles gatherers, as major extensions of mud are left uncovered by water, so the gathering ground increases. In January, during *el aguaje*, vast spaces of mud are uncovered but they do not bring more cockles. As every expert *conchera*[73] will tell you, cockles cannot survive under these exceptional conditions so expert gatherers do not waste their time exploring these grounds.

4.4.3 The tidal time

The tidal conditions have created a specific time management in the mangrove communities, they are not governed by the normal solar day and month, they have what I call a "tidal calendar" governed by the tidal rhythm and the moon. This time management is quite puzzling for newcomers to the area, but expertly understood by the inhabitants of the mangrove communities. An expert cockle gatherer will tell you at which specific solar time the water will be low even months in advance. This is a complex knowledge, and normally people do not reflect on its importance, and the need to understand, that a different time management requires an adaptation of our clock-time. For example, the formal school calendar (based on what is considered the normal clock-time) disrupts this

[73] Name given to the female cockle gatherer in Ecuador, in Colombia they are known as Piangüeras

tidal time management in the mangrove communities. The same happens with the technicians and workers of different development projects and programs, health brigades and even black activists. They do not recognise the importance of the difference in the approach to time and instead, set meetings, courses and other activities in the morning or midday, making it especially difficult during *puja* time, when the best time to go fishing or gathering cockles falls during the morning. As a result, many times workers have arrived to find an almost deserted community. Outsiders do not understand that people will not stop going fishing or gathering during *puja* times of the month as they are considered the best for fishing and gathering. During *puja* the working shift (*faena*) falls in the morning.

The lack of understanding of this specific time management, by programs and project workers, creates tensions between the communities and the workers. I noticed during my research how upset the community feels by this. Normally the technicians and workers set meetings in the mornings or just arrive in the communities expecting that people will be there. Communities do not understand why they do not come during *quiebras* or when the water is high, even in the afternoons or on Saturdays when almost everybody is *encima de casa*[74].

Talking to the program and project workers I realised they do not understand why some weeks they go to the communities in the mornings and everybody is at home ("doing nothing") and other times they are not there. The changing working day of the mangrove dwellers, governed by *pujas* and *quiebras* and following a lunar calendar, is not easy to understand, especially if you only go to visit for short periods of time. If you go during *quiebra* time you will have a totally different perspective of the community activities, and you would assume that the communities work very little. This has been always the problem with development workers visiting the area on very short trips, and then judging the communities as lazy or careless. They do not understand that the working day of a fisher or gatherer is very different. Understanding this different time management can result in a improved program of activities with more community participation and will show the communities that programs and projects are at least making the effort to understand their conditions.

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[74] A local expression meaning at home, but that literally translated means to be on top of the house, maybe because they are literally on top of stilts.

Noting these different perceptions and use of time, I invited the arc cockle gatherers (during *quiebra* times!) to create a "cockling" calendar, so technicians and workers can understand why sometimes they are at home and at others they are not. The method I devised to construct the calendar was simple. During high waters, female cockle gatherers get together to talk about what is happening in the community, I sat with them and asked them to explain to me the clock times of the *pujas* and what were the moon cycles during those times. I also asked them how many hours they spend in the mangroves in each *faena* and how good the *faena* was. Then I compared this information with the tidal charts produced by the navy to adjust the minutes of the tides. Table 4.1 shows an example of one such calendar which only needs to be adjusted, depending on the month.

Looking at the cockling calendar it is very easy to recognise a working pattern. The first 2 days of *puja* are excellent and will be repeated every other week. During the first *puja* day, gatherers will have a double working day. The *puja* working day falls always in the morning and the *quiebra* working day is done in the afternoon. There are several days of the month when waters are not good at all and people will stay at home. These days will not normally fall on Sunday; it could be any day of the week. What is interesting is that external workers and people working in San Lorenzo or Limones (more urban communities) follow the western working calendar, Monday to Friday, 8 or 9 am to 5 pm. So, their interaction with the communities will be done through their time framework and not within the community time framework. Given the differences of time management, there will always be differences, until one of them understands and adapts to the others time management. What happens currently is that the community is the one that sometimes adapts to the outsiders schedules. It would be helpful for outsiders to understand the mangrove community's specific time management and adapt their schedules to them. The cockling calendar can provide important data for achieving this.

Table 4.1 Cockle gathering tidal calendar

Day	Name	Time of Low tide		Moon Cycle	Faena	Quality
1	Puja	06:12	18:38	Full Moon	2 (am, pm)	Excellent
2		07:02	19:28		1 (am)	Excellent
3		07:52	20:18		1 (am)	Good
4		08:42	21:08		1 (am)	Good
5		09:32	21:58		1 (am)	Good
6		10:22	22:48		1 (am)	Regular
7		11:12	23:38		1 (am)	Regular
8	Quiebra	12:02	00:28	Menguante	None	
9		12:52	01:18		1 (pm)	Regular
10		13:42	02:08		1 (pm)	Regular
11		14:32	02:58		1 (pm)	Regular
12		15:22	03:48		1 (pm)	Regular
13		16:12	04:38		1 (pm)	Bad
14		17:02	05:28		None	
15	Puja	17:52	06:18	New moon	2 (am, pm)	Excellent
16		18:42	07:08		1 (am)	Excellent
17		19:32	07:58		1 (am)	Good
18		20:22	08:48		1 (am)	Good
19		21:12	09:38		1 (am)	Good
20		22:02	10:28		1 (am)	Regular
21		22:52	11:18		1 (am)	Regular
22	Quiebra	23:42	12:08	Creciente	None	
23		00:32	12:58		1 (pm)	Regular
24		01:22	13:48		1 (pm)	Regular
25		02:12	14:38		1 (pm)	Regular
26		03:02	15:28		1 (pm)	Regular
27		03:52	16:18		1 (pm)	Bad
28		04:42	17:08		None	

Source: author's own based on community and tidal chart information (2003)

4.5 Describing the study area

4.5.1 The Ecological Mangrove Reserve Cayapas-Mataje (REMACAM)

Located in the delta formed by the estuary of the Cayapas-Santiago-Mataje rivers in the north of Esmeraldas, the northernmost province of Ecuador on the border with Colombia (see Chapter 3, Figure 3.1). The Reserve encompasses 53,200 ha of which 32,250 are terrestrial habitats and 18,000 mangroves. REMACAM is part of the Protected Areas National System of Ecuador and was established in January 1996 (Resolution 001 DE 052-A-DE). As a protected area, the territory in the REMACAM became patrimony of the state, legally making the state the only owner of the area, the state administers and protects the reserve through the Ministry of Environment office.

The mangrove system in the reserve shelters one of the last remaining fully functional mangrove ecosystems of Ecuador, with the highest number of wild species of flora and fauna (Rosero 1999) and containing some of the tallest mangrove trees in the world (Ochoa 1998). This system is part of a continuous mangrove belt that commences in the central area of the Colombian Pacific coast (Cape Corrientes) and finishes in the south of Esmeraldas province.

The reserve is one of the last places in Ecuador where traditional mangrove resource exploitation activities have not yet been displaced by other uses. Its inhabitants, the majority of whom are of black origin (afro-Ecuadorians), rely directly on the mangroves and other natural resources for their livelihood. They are grouped mainly in small communities located along the rivers and in the mangrove islands formed by the estuary mouth. The fieldwork focused on the rural communities located in the mangrove islands where the majority of REMACAM inhabitants live (87%). There are 31 rural communities in the reserve, with approximately 5,600[75] inhabitants; however, geographically the reserve includes San Lorenzo and Limones (see chapter 3, Figure 3.1). Compared with the rural communities, these towns are big urban towns with 20,000 and 10,000 inhabitants respectively (FEPP-Manglares& INP 2002). Administratively they do not belong to the reserve, but in practice they use the reserve and its resources.

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[75] This number refers to the number of inhabitants in the small rural communities inside the reserve. According to FEPP-Manglares and INP (2002) the total number of inhabitants of the area that have influence and/or benefit from the natural resources of the reserve (directly or indirectly) are circa 38,000: 20,000 in San Lorenzo, 10,000 in Limones, 3,000 in la Tola and 5,600 in the small islands communities.

Another important aspect is that although the reserve is considered the most pristine mangrove system of Ecuador, the shrimp farming industry has already arrived in the area. According to the latest survey, completed by the mangrove project and the Ministry of Environment (FEPP-Manglares 2002), there are 45 shrimp farms in the reserve occupying a total of 3,114 ha. Seven of them occupy 68% of the total number of hectares and the biggest farm occupies 764 ha, all of them have been built in mangrove areas and 90% of them are illegal. The big shrimp farms are located in the central and southern parts of the Reserve and thus they affect some communities more than others, e.g., Tambillo and Olmedo are surrounded by shrimp farms.

4.5.2 Communities Social and Economic characteristics

One of most interesting characteristics found in the communities in the REMACAM is their adaptation to the mangrove ecosystem. Houses are commonly built on stilts in the inter-tidal areas of the mangrove islands formed by the river delta (see Figure 4.3). The communities are always located in sheltered areas behind mangrove stands so they are protected from strong waves and winds. The mangrove roots act as sediment traps protecting the communities from erosion and creating new soil. The communities are isolated from the continent with the only access to them by sea. During high tides, estuaries and branches cushion the waves, allowing people to navigate to very distant places in their small "water horses" (*potros*), a task that would be impossible in the rough open sea.

Communities are normally quite small, 74% of them have between 4 and 28 households. Only 13% of them have more that 130 households, the biggest (Pampanal) has 225. There is an average of 4.46 people per household, houses are normally small, 88.7% of them are built from wood, of which 55% is mangrove wood; the others are made of a mix between wood and other materials like bricks and concrete. In almost all cases the roof is made of corrugated iron.

Basic social infrastructure in the communities is scarce. The research found a correlation between the size of the communities and the type of infrastructure and government intervention, basically the smaller the community the scarcer infrastructure is. For example, electricity and basic health infrastructure (small medical centre with a communitarian nurse) are only found in the bigger communities (Pampanal, Palma Real

and Tambillo). Small communities rely on health campaigns from San Lorenzo and Limones hospitals, which are very irregular. Some communities like Pichangal and El Viento have a small solar plants that produce electricity for 4 hours in the evening. Two communities, La Barca and Canchimalero, do not have access to electricity.

Figure 4.3 Typical community in the REMACAM

A basic piped water system can be found in Palma Real and a treated water system is being installed at Pampanal and Tambillo. In the small communities, rain is sometimes the only, and in all cases, the most important source of water, some communities have small wells for use during dry times. Rain and well water is treated (boiled or bleached) by 23% of the households surveyed. There is not sewage system in any of the communities and only a very small percentage of household have latrines, 15.5%, built mainly in the bigger communities by FISE (government Fund for Social and Emergency Investment). Waste and organic residues from the houses are all discharged directly into the estuaries and the sea.

In terms of education this research found that there is a lack of schools in several communities (see table 4.2) even though there are more than 100 children in those communities. In the communities where schools are found, they are very basic primary schools and under-staffed, for example in, Tambillo there is only one primary school with

two teachers for 300 children. In Palma Real, one of the biggest communities in the REMACAM, there is only one secondary school with only one teacher.

Table 4.2 school characteristics in the REMACAM area

Community	**No. of children**	**School characteristics**	**No. of teachers**
Canchimalero	65	Primary (in construction)	none
Campanita	33	New primary school	1
El Bajito	15	No school	none
El Viento	33	No school	none
El Guachal	9	No school	none
La Barca	44	New primary school	2
Palma Real	273	Primary, secondary	5
Pampanal	375	Primary (1 to 6 grades)	7
Pichangal	15	Primary school	1
San Antonio	60	Primary school	1
Santa Rosa	92	New Primary school	2
Tambillo	300	Primary	3

Source: Fieldwork 2002

Due to a lack of schools in their area parents are forced to send their youngsters to urban areas for continuing education, in these cases the children are sent to live with relatives or friends in San Lorenzo, Limones, La Tola or even Esmeraldas. The socio-economic survey showed that in all small communities the number of children between the age of 10 and 17 is very low (compared with big communities). Almost every family interviewed had one or more children studying in the bigger communities. When the child is not too far away, she/he will come back during the weekend to be with the parents, but in the case of children sent to Esmeraldas and sometimes to Quito they seldom come back to the communities.

In other cases the parents decide to migrate to the bigger cities so their children can be educated. A very interesting case study of this trend is the one in Pichangal community, (see annex IV), according to our data at least 44% of the families have migrated to San Lorenzo or other big communities in the past 5 years.

People in the communities are very worry about what they see as a forced migration. Community leaders think some of the communities will disappear in few years, as is happening in Pichangal, and has already happened in other small communities such as La Tolita de los Ruanos, where there is only one family living now. This is why communities in the REMACAM and their leaders identified the lack of school, or lack of access of children to school as one of the major problems in their communities. For example in the new communities' management plan being drafted by the mangrove project, 60% of the communities identify school as one of the most important needs. Without children and young families they said the communities will not be able to look after the mangroves and the mangrove resources. Chapter 7 (section 7.3.2) will present a more abstract but also important concern about the school system, and the claims by the PCN that the current formal system of schooling is a continuation of the acculturation process that black people have undergone since their arrival into the new world as slaves.

4.5.3 Mangrove species in the REMACAM

As will be analysed in chapter 6 (section 6.4.4), an important gap in mangrove legislation in Ecuador is the lack of legal definition of the mangrove ecosystem and the species contained within it. In this section I will introduce the most important species of mangroves contained in the REMACAM area, and the names given by the traditional local communities[76]. This information is important as it has provided the basis for the legal definition proposed by C-CONDEM in the communitarian mangrove conservation law presented to the government (see chapter 7, section 7.3.4). Also in this section, I will analyse the common names given by the local communities to the different mangrove species, indicating how they demonstrate a very specific botanical knowledge and how local dwellers recognised subtle differences among the mangrove species.

There are seven species of mangrove trees reported in the REMACAM area (INEFAN-GEF 1998) and when I worked with the local fishermen and cockle gatherers I found that the people in the communities recognised all seven species (see table 4.3). However some of species are named slightly differently to the names found in neighbouring communities and in the academic reports. Column three in the table shows

[76] Methodological note: Information for this section was collected using personal observations and informal questioning during trips to the mangrove areas to collected wood and other resources. Information was also gathered by accompanying fisher-people and cockle gatherers during their fishing trips.

the common names used in the literature and column four shows the names used in the REMACAM area.

Table 4.3 Mangrove species found in the REMACAM area

Family	**Scientific Name**	**Common name**	**REMACAM names**
Avicenniaceae	*Avicennia germinans*	black mangrove	**Iguanero**
Caesalpinaceae	*Mora megistorperma*	"nato" mangrove	Nato
Combretaceae	*Laguncularia racemosa*	white mangrove or "comedero"	**Pava**
	Conocarpus erectus	button mangrove or "jeli"	Jeli
Pellicieraceae	*Pelliciera rhizophorae*	"piñuelo" mangrove	Piñuelo
Rhizophoracea	*Rhizophora harrisonii*	red mangrove	**Injerto**
	R. mangle	red mangrove	**Concha**

Source: fieldwork , 2002.

Another curious observation is that people in the REMACAM call *Rhizophora harrisonii*: *injerto* (graft mangrove), which, in my opinion makes sense as this mangrove species has some characteristics of *R. mangle* but is not identical. Some authors argue that *R. harrisonii* is the result of hybridization between *R. mangle* and *R. racemosa* (von Prahl *et al.* 1990), but there is no agreement on this. Other authors have only recognised *R harrisonii* after lengthy botanical studies (Tomlinson 1986). The name used by locals is showing us very specific knowledge about the mangrove species and the ability to recognize subtle differences within them. These findings are similar to Kovacs (1999) results when working with mangrove communities in Mexico. According to the author, local fishermen can distinguish small variations between species and give mangroves very specific local names, which sometimes can differ from the neighbouring villages.

An unusual name given to *R. mangle* in the REMACAM is "cockle mangrove", this species is normally known as red mangrove in other areas and in academic reports. The interesting aspect about this local name is the fact that cockles habitat is among this species roots. You normally find cockles in the roots of "cockle mangrove". This local name is showing the recognition that locals have of specific habitats for the cockles. After years of working in mangrove areas and revising the literature this is the first time I have come across this common name for *R. mangle;* so it could be argued that the importance of cockles in the area is shown through the recognition of the naming of this mangrove species.

Other local names like "iguanero" (literally the one with iguanas) for *A. germinans* and "Pava" (a type of heron in the area) for *L. racemosa*, are again showing us a specific knowledge which is linked to species of animals found in the trees. What I found appealing about the common names in the REMACAM is that they differ from some of the common names found along the American Pacific coast. Normally, local communities distinguished or assigned names to mangrove species according to wood characteristics, such as the colour. So you always find red, white, black and yellow to refer to the different species of mangroves; interestingly, communities in the REMACAM have assigned common names according to other characteristics. This difference in naming could be the result of changes in the way mangrove species are used in the REMACAM area. A likely explanation for the variation in common names could be the diminishing importance of mangrove wood in the REMACAM area (see chapter 5, section 5.3).

Another important aspect of the mangroves is the existence of zones. Often of mono specific species, these zones can be observed as vegetational parallel bands. These bands are modified by local topography, sediment composition and stability, salinity and freshwater run off. Mangrove zonation (as is it called), is a very important ecological characteristic that can give us instant information about sediment changes, tidal and run-off disturbances[77], serving as clear indicators of changes and disturbances. Along the coastal fringes in the REMACAM we have a first band of red mangrove, (*Rhizophora mangle, R. harrisonii*), which is the most abundant and dominant. Its labyrinth of arching roots allows the trees to conquer the soft, unstable substrata exposed to a wide tidal range (up to 2 m) young pioneer trees are then followed by mature ones. Behind this strip we find more stabilised substrates with a higher content of sand (47%), and minimal tide levels of about 30 cm. This is normally dominated by *Avicennia germinans* (*Iguanero* or Black mangrove), which are better adapted for more stable soils. Among both red and black mangroves we find some conspicuous individuals of the *Lagungularia racemosa* (*Pava* or White mangrove). The most stable zones with firmer soils, (locally known as *firmes*) are occupied by the magnificent *Mora megistosperma* (Nato mangrove) and *Pelliciera rhizophorae* (Piñuelo), this band shows the transition from inter-tidal to terrestrial ecosystems. When participating in the cockle gathering *faenas* and during mangrove

[77] Each mangrove species needs specific conditions to be able to develop, so small changes in any of these conditions are reflected in the way mangroves grow, this allows us to identify natural or human-made disturbances.

explorations with traditional fisherpeople, I realised that cockle gatherers and fishermen recognised this specific distribution of mangrove species. In the case of cockle gatherers it helps them to identify the best suited places for gathering cockles.

Another important aspect familiar to the local gatherers is the fern *Acrostichum aereum* (*Ranconchal*), this mangrove associated species indicates the beginning of the terrestrial ecosystems. Additionally, *A. aereum* will invade disturbed mangrove areas, indicating where mangroves have been cut or in which changes of water regimes they have occurred. In ecological terms it is known as an 'indicator species' which allows the easy identification of mangrove areas which have been intervened.

The importance of the ecological function of the REMACAM mangroves which is normally overlooked by the government and developers, is the maintenance of the biodiversity and genetic resources. The REMACAM mangroves are the last remaining pristine mangroves in Ecuador, they harbour not only the tallest mangroves in the world but also a high number of endemic species, several of them being endangered and vulnerable (see table 4.4).

Table 4.4 Vulnerable and endangered species found in the REMACAM

Species	**Common name**
Lutra longicaudata	water fox
Bradypus varieguatus	perico ligero
Touit dilectissima	Loro (parrot)
Ortalis erythrogenous	perdiz
Cocodrylus acutus	Cocodrilo o lagarto

Source: modified from INEFAN-GEF, (1998)

According to Rosero (1999 based on INEFAN data), the intrinsic biodiversity value of the REMACAM reserve is 706[78], this number does not include the high number of aquatic invertebrates. According to recent findings of research carried out by FEPP and the National Fisheries Institute, (not yet published), the phyto and zoo plankton in the reserve estuaries override the number of species found in all the Ecuadorian coastal areas (Lemos 2003).

[78] This number corresponds to the number of endemic species found in the area: 203 (birds), 53 (mammals), 68 (fish), 16 (reptiles), 20 (Amphibious), 30 (forestry species), 306 flora and non-forestry species (Rosero 1999).

All the ecological concepts described above have become especially important in the struggle to defend mangroves in Ecuador. As we analysed in chapter 4, an important aspect of the legislation on mangroves is the lack of definition of what constitutes the mangrove ecosystem. Because there is no clear definition of which species are considered mangroves, shrimp farmers have exploited the loop-hole, invading and cutting areas of dwarf mangroves, Nato, *Pelliecera* and *A. aereum*. According to them, these species are not mangroves. In some cases the shrimp farmers invaded *A. aereum* areas and started building changing the water dynamics and substrate composition which impacts the surrounding mangroves. When the mangrove trees subsequently died they moved in and built full farming facilities. In the REMACAM this process is becoming especially important due to the expansion of African palm plantations, with some of them are invading the edges of the mangroves. With the approval of the mangrove conservation law and its proposed definition, the legal definition loop-hole will be closed. Due to its importance, the issue of the definition has become one of the hot, more debatable aspects of the law proposal in Congress.

Chapter 5 - Mangrove perceptions and uses in the REMACAM

5.1 Introduction

Chapter 4 analysed the complexity of the mangrove ecosystem and how mangrove ecological services and functions had been generally underestimated and overlooked by government officials, planners and developers. It also discussed how the local communities have the ability to recognize subtle differences within the mangrove species in the area, showing they possess very specific botanical mangrove knowledge. This chapter shows how the environmental discourse about mangroves is produced and shaped by local experiences and practices and can be also informed by external narratives trickling down from the national and international environmental discourses. Section 5.2 explores how specific knowledge about mangroves can be extended to the recognition of some mangrove ecological services and functions. According to the data local people have an ample perception of mangrove functions and are able to distinguish even some of the most abstract functions such as oxygen producer and recycler. In section three the importance of mangroves as direct source of forest products and raw materials will be explored. The section will also analyse how, according to the data, it is possible to identify how knowledge about some mangrove uses is getting lost due to the introduction of new materials and practices in the area.

Section 5.4, on the other hand will explore the indirect uses of mangroves in the REMACAM. It will show how local communities fully recognized the important role played by mangroves in the maintenance of local fisheries. For them, it is thanks to mangroves that fish, shrimps, crabs, snails, cockles can be harvested and this is the most important use of the mangrove ecosystems. The extraction of natural resources from the mangroves is seen by the REMACAM communities as the most important use of mangroves in the area. Local people fully appreciate the important role played by mangroves in their local economies. As they see it, mangroves are the source of all life and the most important source of work, and a source of protein. When questioned about the importance of mangroves for their well-being, community members stressed the importance of the mangrove ecosystem for their livelihood. Common statements during interviews and informal questioning were, "mangrove is our life, it gives us cockles, crabs, fish"; "mangrove is the most important thing for us"; "if we don't have mangrove we will

not eat, we will not live"; "mangrove cockles is the life of the poor"; and "if mangroves disappear, we all be finished, mangrove is our life, our source of work". They believe that the disappearance of the mangroves will inevitably lead to a disappearance of their communities.

Section 5.5 will analyse which are the most important natural resources extracted from the reserve. It will show how in the study area, the use and allocation of natural resources is divided along gender and age lines: men fish, whilst women and children gather cockles. The artisanal fishing and the cockle gathering fisheries will be examined in detail in order to provide insights into the changes taking place. Section 5.6 will explore the changes in resource allocation and practices in the study area, showing why these changes are occurring and how they are affecting the traditional management of natural resources in the REMACAM.

Throughout the chapter different knowledges around the mangrove ecosystem will be explored: what do the people know, how do they use this knowledge? Are knowledges and perceptions changing over time? If so why? All these questions will be explored examining two contrasting ideas: on the one hand, people like Galvez (1998) suggest that the knowledge people have on the mangroves in the REMACAM is "primary and short-sighted and only limited to the extraction practices"[79] whereas on the other hand, authors like Mera-Orces (1999) see the REMACAM dwellers, especially women, as repositories of incredible ecological knowledge about mangroves.[80] Which type of knowledge can be found among the REMACAM dwellers? Can we describe them as holders of an incredible and highly specialized indigenous knowledge that has allowed them to survive in this ecosystem? Or are they just exploiting the system? Can we talk about a special relationship between dwellers and the ecosystem? And can we find evidence of a complex knowledge system acquired by the local communities in order to be able to adapt and survive in the mangrove?

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[79] "Las familias entrevistadas tiene una percepción del manglar relacionada únicamente con la sobre-vivencia. Es una visión al nivel primario e inmediatista. El conocimiento se limita a la practica extractiva ya que es el medio de sustento (Gálvez 1998:42).

[80] "El concheo requieres de un gran conocimiento del manglar y de los ciclos de vida de la concha, las concheras tienen este conocimiento sobre la biología de la concha y tiene mucha experiencia en localizarla" (Mera-Orces, 1999, page 78).

5.2 Local perceptions of mangrove functions

In chapter 4, section 4.2.2, we described the ecological functions and services of mangrove ecosystems reported by biologists and ecologists and how these are overlooked by the government when making decisions about mangroves. What I found from the information collected during fieldwork, is that local communities in the REMACAM clearly understood the role of mangroves in supporting fisheries: fish, shrimps and cockles and other molluscs. When asked about what will happen to the fishing if mangroves disappear, 96% of the fishermen interviewed answered that fishing will also disappear. The majority added *"don't you understand that fish and shrimps get refuge and food in the mangrove roots, so if food is not there they will emigrate, additionally they lay their eggs there (in the roots)"*. Several of the fisherman argued that fishing has diminished in the area due to the mangrove cutting when the shrimp farms were built. Some of them believed, that the discharges from the farms and the palmaculture, have a big impact on the fisheries and the mangroves in general. Table 5.1 illustrates the mangrove functions identified by people in the REMACAM, (the functions reported here do not include the direct uses of mangroves in the study area, this will be analysed in section 5.3).

Table 5.1 Ecological functions of mangroves as identified by respondents in the semi-structured interviews and informal focus groups undertaken in REMACAM

Function	**Example given**
Nursery	juvenile fish and shrimp in inlets and mangrove roots
Feeding grounds	fish and shrimp feed during high waters
Habitat	cockle, crabs and other molluscs live in the roots
Beach protection	mangrove protects from erosion
Oxygen producer	mangrove trees produce and recycle oxygen

Source fieldwork (2002)

The above examples show us that mangrove dwellers have an ample perception of mangrove functions, and can distinguish the indirect functions of mangroves. They can also recognize interesting aspects like species migrations, fish and others species that come and feed in the mangrove during high water and then go back to the open waters, permanent residents (cockles and others that spend all their lives in the mangroves); they understand as well the dependence of some animals on the mangroves. All these are

complex ecological concepts that are the focus of much research and debates among biologists and ecologists.

Fieldwork findings contrasted with Galvez's (1998) idea, that the knowledge among the REMACAM dwellers is short-sighted and that it refers only to extractive uses. Observations about the nursery functions of mangroves are very important, there is still debate among researchers and scientists concerning the real role that mangrove ecosystems play in the biology of commercial fish and shrimps. Some authors argue that these functions are still not clear and that more research and data are needed if mangroves are going to be fully protected (see for example: Sheridan& Hays 2003). People in the REMACAM are very clear that mangroves provide food, refuge and habitat for many species without which their livelihoods would be impossible. Additionally, they recognize the importance of mangroves as shore protectors and some have even started thinking about more abstract functions, like oxygen producer and recycler.

Some of these knowledges are not widely distributed among all local people. The first three functions from the table are more widely identified[81] by fishermen, cockle gatherers and people from other occupations. Functions such as beach protection and oxygen producer were identified for a minor number of people, cross-tabulating the information, I found that some of these respondents are part of the mangrove defence groups or have taken part in some the mangrove project workshops. Therefore it is likely that these identified environmental functions are part of the environmental narratives that have trickled down to the local communities from the environmentalist discourse (see chapter 6, section 6.2.3).

It is important to note that some other important ecological functions of mangroves are apparently not perceived. The fact that mangroves act as sink pollutants, for example, can become very relevant, as chemical residues from the shrimps farms and African palm plantations will end up in the REMACAM mangroves, also some of the species (fish and molluscs) have the potential to accumulate them. Other aspects that can become very important for the protection of mangroves are their potential as a tourist attraction due to the uniqueness of the area, (the tallest mangrove in the world for example) and its

[81] Methodological note: the names of the functions were given by me, from the examples given from the respondents. The questions asked to the respondents where generic questions such as why you think mangroves are important or what will happen to fish if mangroves disappear?.

importance as a migratory route for birds. The local people appear not to be aware of these aspects, but they can be very important in the struggle to defend this mangrove area and to find economic alternatives.

On a more practical level, it seems that locals do not recognise the wider implications of regional changes and how these can affect mangroves and their own communities. For example, the opening of the road between La Tola and Esmeraldas and the water dynamics changes that have taken place around Olmedo, due to shrimp farm construction, were not raised by respondents, despite the fact that a very poignant example is occurring in La Barca community where coastal erosion has increased dramatically in the last two years and is now threatening the viability of the community. From formal and informal talks with the inhabitants of the community, I realized that they do not have a clear understanding of what is happening. According to them, there have been no similar happenings during the past 60 to 70 years. My opinion, based upon information provided by local people and on preliminary observations in the area, is that the erosion problems in La Barca are directly linked with the formation of a sediment bar in front of Cuerval, Olmedo and La Tola communities. This bar has increased since the construction of two of the biggest shrimp farms in the region Purocongo: 764.5 ha and El Rosario: 513.5 ha, and La Tola-Esmeraldas road. These constructions have increased the amount of sediment discharged into the Cayapas River; this sediment is accumulating in what used to be a very wide river mouth, as a result creating a smaller river mouth with stronger currents that run directly into La Barca's beach. Due to the increased currents mangrove replenishing has not been possible.

When I asked the local people about changes in the current speed in the channel, the increased size of the sediment bar and increase in erosion they told me that they have noticed some changes. What I found interesting though, is that they never put all of these factors together to realize that the constructions of road and shrimp farms have a direct effect on their community. This example shows how some of the knowledges and perceptions are very localized and, because there are so many external changes taking place rapidly and on a wide scale, it is very difficult for the local communities to deal and to adapt to them. As will be discussed in chapter 6, section 2.4, when dealing with natural resource and environmental management, we need to be aware of the external forces impinging upon local communities and how to develop new integral strategies that put

communities, their knowledge and experience at the core, at the same time help them to understand and adapt to the wider, external changes upon which they do not have control.

5.3 Mangrove direct uses and knowledge

The importance of mangroves as direct sources of forest products (timber, charcoal, poles, and tannins) and raw materials (pulp wood, wood-chips, and rayon) have been well documented around the world. In many Asian countries for example, mangroves play an important role in the national economies. Hamilton and Snedaker (1984) reported more than seventy direct uses of mangrove trees, (see annex V). Mangrove wood is durable and termite-resistant, due to these properties it has been used for many years in commercial building and ship construction. In the REMACAM during the 1950s and 60s there was a large market for mangrove posts for construction, and several logging companies were dedicated exclusively to the extraction of mangrove wood (Isherwood 2000).

Among the REMACAM communities mangrove wood has been traditionally used for house building, firewood and charcoal production, also tanning extracted from the bark were used to dye and strengthen fishing nets. But, due to the new regulations (the status as a reserve), and the introduction of new techniques and materials these uses are changing. Table 5.2 illustrates the current actual direct uses of mangrove wood among the REMACAM communities.

According to the findings from the semi-structured interviews, building is the single most important use of mangroves in the REMACAM, with 55% of the household reporting using mangrove wood for building. I compared these findings with the information obtained from the Socio-Economic Survey (SES) where the general information about households was colleted. In the SES we found that 88.7% of the houses are made of wood, with the rest made of a mix between wood and other materials like bricks or concrete. So, comparing information from both sources we can infer that a quite high percentage of households (more that 33%) do not use mangrove wood for building their houses. This inference can be corroborated by some of the respondent's comments; they reported they are using wood from the surrounding rainforest area because the wood is finer than mangrove wood. Apparent here are two very interesting issues, first, it is normally assumed that local people in the mangrove communities can cause damage by directly harvesting mangrove wood, this is the case in several other countries where mangrove is

the principal source of lumber, (see for example: Macintosh& Ashton 2002). Another aspect is that the introduction of chainsaws has made rainforest wood more available, so decreasing the impact on mangroves, while in turn, increasing it in rainforest areas. The other likely explanation for the decreasing use of mangrove wood is the new status of the area as a mangrove reserve, even though the new regulation regime (as a reserve) has not banned the traditional use of mangrove for local house building, this is not widely understood by local people.

Table 5.2 Direct uses of mangroves as reported by respondents in the semi-structured interviews undertaken in REMACAM

Type of use	**% of households***	**Species used**
Building	55	*Rhizophora mangle, R. harrisonii*
Fuel-wood	14.8	any
Charcoal	3.5	*R. mangle*
Other[82]	2.8	all
Don't know	2.8	
Not use	13.4	
N/A	28.2	

Source: Fieldwork , 2002
* The percentage given here is not exclusive as some households reported multiple direct uses.

The second, more important direct use of mangrove wood in the REMACAM, was firewood (14.8%). This result is extremely important for, as with building, firewood is seen as another local way of destroying mangroves. Here we found that less than 15% of the households use mangrove as fuel wood, this result is totally supported by the result in the SES. According to these results more that 87% of the households reported having gas stoves and cooking with gas and only 9% reported cooking with wood (these are the poorer families); so the slightly higher percentage of people reporting mangrove as fuel wood (in the interviews) refers to an occasional use, when the gas bottle runs out. Isherwood, (2000), found that people were worried about increases in the price of gas and how this would be likely to increase the number of households reverting to firewood or charcoal, causing negative impacts in the mangrove. According to data from this research this has not happened even though with the dollarisation of the economy, fuel cost has risen. The

[82] Other uses found: to smoke fish (0.70%), keep food (0.70%), bake fish (0.70%), quilla (0.70%)

extraction of mangroves for fuel-wood still remains at a subsistence level among the REMACAM communities.[83]

The other direct use of mangrove wood that has decreased enormously during the last years is the commercial production of charcoal. According to this research only 3.5% of households report its use, it seems likely that this is mainly at subsistence level as only one household (0.58%) reported selling charcoal as an economic activity.

Compared with direct uses for mangrove reported regionally and worldwide (see for example: Janssen *et al.* 2000, Kaplowitz 2001a, Glaser 2003), we can say that the direct uses of mangroves in the REMACAM are quite limited. Mangroves around the world are perceived as an incredible source of products, e.g. building materials, charcoal, traps, tannins, fodder, green manure, honey, wax, medicine, etc, According to our findings this is not happening in the REMACAM. Even though multi-use was reported, looked at in detail, only a 3.5% of households report 3 uses, 14% reported two uses and 37% only one use. None of the household reported more than 3 uses. What I found even more interesting was the high number of interviewees who did not answer this question: 28.2% of the total number of people interviewed (this is the highest percentage of not answer (NA) question in all the data collected during fieldwork). Looking at the distribution of the of the NA questions by community, we can see a correlation between some characteristics of the different communities. For example, the big communities with a large number of shrimp farms (Pampanal, Palma Real, Tambillo) have the highest number of NA answers (see table 5.3). We can argue that this correlation is showing us that the loss of mangroves due to the construction of shrimp farms, is leading to a decrease in the use of mangrove resources in the communities affected and, that is the reason for the high number of N/A.

Another inference we can make is that the knowledge about mangrove uses is getting lost in the REMACAM area, for example, it is known that the mangrove leaves and bark have medicinal qualities and is normally used by mangrove dwellers (Hamilton& Snedaker 1984, Snedaker 1986, von Prahl *et al.* 1990). However during the survey and interviews nobody mentioned mangrove medicinal properties to me. What is interesting is that Torres-Benavides and Yépes-Reyes (1999) reported the use of button mangrove

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[83] It is important to note that this study has not surveyed or interviewed people in the big communities (San Lorenzo and Limones) which are not part of the REMACAM but have access to its mangrove resources. Their impact on the REMACAM needs to be evaluated.

(*Conocarpus erectus*) as medicine against the venomous fish stings. During the cockle gathering *faenas* a couple of cockle gatherers mentioned to me the use of mangrove leaves when somebody gets stung by venomous fish. From his research in the REMACAM area, Gagnon (1998) reports the use of red mangrove propagules to numb the pain of toothache[84]. During fishing trips I have also observed some old fishermen using mangrove sticks for fish traps. So, the fact that nobody reported these direct mangrove uses could be showing us that these practices are not widely distributed among the local communities and the knowledge is getting lost due to the lack of use.

Table 5.3 Distribution of not answer question (NA) by communities

Community	**No. of NA**	**Community characteristics**
Pampanal	10	Big, high number of shrimp farms
Palma Real	9	Big, high number of shrimp farms
San Antonio	6	In terrestrial part
Tambillo	5	Big, high number of shrimp farms
La Barca	4	FEPP Building programme
El Bajito	3	Small, majority of people with farms
Viento	2	Small
Santa Rosa	1	Medium size

Source: fieldwork 2002

Another interesting observation is the lack of use of mangrove tannins in the REMACAM area. Until 10 years ago I observed mangrove fishermen in mangrove communities in Colombia, using tannins from the mangrove bark to dye and strengthen fishing nets. During my fieldwork in the REMACAM I did not see any fishermen using this technique. It can be argued that there is a decrease in the direct uses of mangroves, and that would have interesting implications for local knowledge about mangroves in the area. For example, in the species reported for the different building uses (refer to table 5.2). Some of the respondents reported the use of specific species for specific building categories, supporting columns and roof beams will be made from different species. Some

[84] It is important to note that this report is the result of only two sightings.

local reported more than 6 different types of building uses[85] while others reported just using one type of mangrove.

Another personal observation is the loss of knowledge about firewood. Some mangrove species have different calorific values, and are therefore used more than others. This knowledge was very important among the people I lived with in Colombia, but I could not find any evidence of this knowledge among the local people in the REMACAM. So we can argue that due to the lack of use, specific mangrove wood knowledge is becoming lost. According to Gagnon (1998:1) findings in the REMACAM area, knowledge that people consider useful is retained while obsolete knowledge can disappear within a generation.

5.4 Mangrove indirect uses

According to the research findings the extraction of natural resources (fishing and/or cockle gathering) is the most important economic activity in the area, with more than 85% of the households dependent on them. Table 5.4 shows the REMACAM occupational structure.

Table 5.4 Occupational structure in REMACAM.

Main economic activity / Income source	**Percentage of households**
Fishing & Cockle gathering	67.7%
Cockle gathering (only)	10 %
Fishing (only)	8.3%
Agriculture (only)	6.5%
Commerce[86]	2.4%
External help[87]	1.2%
Shrimp farming (only)	0.6%
Other occupations (not related to mangroves)	2.9%
Other occupations (related to mangroves)	0.6%

Source: fieldwork 2002

[85] This refer to specific parts of the houses, they will use different specie for frames or roofing. Poles and stilts will be made of another specie. Stairs and floors will use other specie.
[86] Commerce refers to small corner shops
[87] External help refers to households that receive money from relatives in other cities or countries

The REMACAM household is normally a poli-activity household. As shown in table 5.4, the main economic activities revolve around mangroves, traditionally the household's fish and/or cockle gathering. From the data it was possible to observe that agriculture is also an important source of income in some of the communities such as Bajito, San Antonio, Canchimalero and Santa Rosa. According to the findings the commercial dependence on the mangrove ecosystem varies among the communities.

Figure 5.1 shows the different percentages of households per economic activity, again it is clear that fishing and arc-cockle gathering are the most important, but also we can see that there is a percentage of households that depend on agriculture, and for one of the communities (Bajito) it is the most important source of income. Other households own small pieces of land and small coconut plantations which are normally attended during fishing or cockle gathering off-seasons. In this case agriculture in not seen as an economic activity but as an insurance in bad times. In addition, many of those who make their living through agriculture or commercial activities will collect cockles, fish, crabs, timber and firewood from the mangroves, on a subsistence basis.

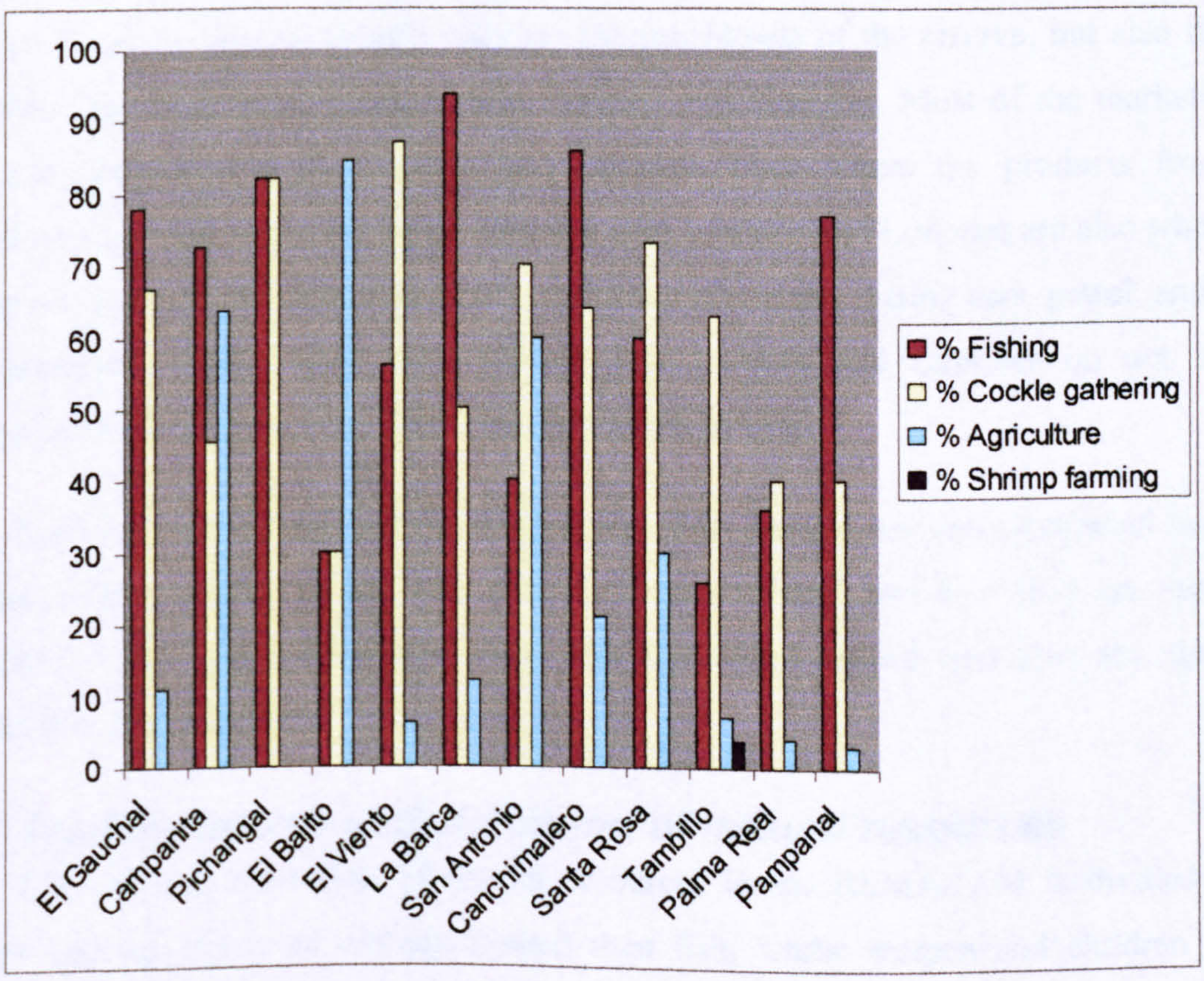

Figure 5.1 Economic profile of each of the communities studied (source: fieldwork 2002)

Two very important aspects should be recognized from this data. Firstly, multiple sources of income are a very important component of the household economy in the REMACAM communities, therefore changes in one of the economic activities will not only affect the total income into the household, but will also affect the importance of remaining sources. Secondly, although communities look homogenous, we need to understand that this is not the case; some of them are mainly agriculture communities which complement the economy with fishing and cockle gathering, while some others have a stronger dependency on fishing or cockle gathering. Therefore, external impacts and changes in resource allocation can affect some communities more than the others.

Even though there are differences in economic activities among the communities, in general the importance of mangroves in the REMACAM economy is huge. According to research carried out by Isherwood in 2000, goods amounting to a total of over 14 million dollars annually are extracted from the mangrove forests, mudflats, creeks and surrounding waters of the Reserve. Non-marketed goods extracted for subsistence use account for 14% of this value, this includes poles and roof beams for house construction, firewood, fish and shellfish extracted for home consumption. It is important also to note that goods and services from the reserve benefit not only the inhabitants of the reserve, but also fishers, gatherers, and businesses based in San Lorenzo and Limones. Most of the marketing of fish and cockles is made through San Lorenzo, from where the products from the mangroves are sent to the rest of the country. San Lorenzo and Limones are also where the mangrove communities obtain external products such as ice, fishing nets, petrol, and fresh and preserved foods. Thus, even though San Lorenzo and Limones do not belong administratively to the reserve they benefit directly from it.

Now we have established the importance of the natural resources extracted from the reserve, it is important to ask who extracts these products, and how they are used and allocated? The next section will show how traditional natural resources are used and allocated in the study area.

5.5 Traditional use and allocation of natural resources

The use and allocation of natural resources in the REMACAM is divided along gender and age lines, as aforementioned men fish, whilst women and children gather cockles. When male children reach 14 to 15 yrs old they switch to fishing. When health

deteriorates, fishermen (around 60 years of age), will take to cockle and mollusc gathering as their main activity. Small agricultural plots (farms) and coconut plantations are the realm of men, with women helping in their maintenance. The research found only one woman with agriculture as her main economic activity. This division of labour is not so evident in the marketing of the products; there are some women that act as community middle-people buying cockles and sometimes fish. They normally live in the communities and sell directly to the bigger towns or to external buyers that visit the communities every week to buy cockles.

5.5.1 Artisanal fishery

In economic terms the artisanal fishery is the most important source of income in the Reserve, employing ~2500 fishers (FEPP-Manglares& INP 2002) and accounting for 77% of the income generated by natural resource extraction (Isherwood 2000). The fishery is also a vital source of protein for the communities in REMACAM, with smaller fish from the catch generally kept for home consumption.

Fishing is exclusively a male activity. Of the 75 households that reported fishing as their main activity, all of them were men. Only a few women were found who helped their husbands put the nets together when the nets are new (*empalmar*). On average, fishermen work 6.3 hours per day in a single daily trip, six days a week excepting fiestas and bad weather. Due to the lack of infrastructure and electricity in the mangrove communities, fish is normally sold every day to external buyers from other communities. External buyers are normally men and even though some of them live in San Lorenzo or Limones, they are normally *mestizos* (mix-race people) originally from interior cities.

A wide variety of fishing equipment is employed in REMACAM. Fishers in the smaller and remoter communities tend to use low-investment equipment and non-motorised canoes, whilst a number of fishers in larger communities own large canoes with outboard motors (Table 5.5). Motorised canoes have only appeared in the reserve in recent years, when petrol for outboard motors was heavily subsidised by the government. Today there are twice as many fishers working from motorised boats as there were in 1995 (Rosales 1995). Until the arrival of outboard motors, fishing activity was mainly restricted to the estuaries and creeks. Today fishers can work the coastal waters up to several kilometres out to sea (Table 5.5).

Table 5.5 Principal fishing equipment used in REMACAM, showing the local name and target species.

Type of gear	Local name	Type of boat	Target spp.	Fishing area
Small trawl	Changa	Big, big motor	Shrimp	Coastal
Seine	Red de enmalle de fondo	Big, small motor	Prawn, finfish	Coastal and estuarine
Beach gillnet	Chinchorro de playa	Small, paddle	Prawn, finfish	Beach and creek mouths
Cast net	Atarraya	Small, paddle	Prawn, finfish	Estuaries
Tangle net	Red de estacada	Small, paddle	finfish	Creek mouths
Long line	Espinel de fondo	Small, paddle	finfish	Creek mouths
Shrimp larvae net	Red larvera	none	Shrimp post larvae	Creeks and beach
Traps	Trampas	Small, paddle	Crabs	Estuaries

Source: adapted from FEPP-Manglares and INP (2002) and fieldwork observations (2002)

The more economically valuable species are shrimps and prawns. In 2002 the shrimps averaged $2 per kg and prawns $9 per kg (FEPP/INP 2002). The small trawl fishery is the most lucrative, but also the one that needs most capital investment. The most common fishing gears are the seine and the beach gill nets which can be used either with motorized or paddle canoes, with 73% of the fishermen owning their own fishing gear. Small trawlers however are owned by more wealthy individuals, and often, a single person owns several that are rented to other fishermen. Men using big and medium sized canoes fish in improvised groups, which are formed only for a specific trip. The income from the fishing trip is divided in two (after the expenses for petrol, oil and others are deducted), 50% is for the owner of the boat and the fishing gear, the other half for the crew. Fishermen in the small canoes fish on their own in the small estuaries and mangrove creeks.

Fishermen from communities in the south of the reserve (where the number of shrimp farms is higher), have changed their traditional fishing methods and now they fish for shrimp post-larvae and pregnant female shrimp, to sell to hatcheries and the shrimp farms. They have developed several types of improvised gears using monofilament nets with a very small mesh-size. These are used in the inter-tidal areas around the beaches and the mangrove creeks. Because there is no need for a boat and the equipment is made at

home, the investment for this type of activity is minimal and attracts people from other communities.

The perception among the communities and researchers in the area is that this new activity is causing serious damages to the wild shrimp population and other commercial fishing species. The nets are non-discriminatory, and as a result, there is a very high by-catch made up of commercial and non-commercial shrimp and fish larvae, which is normally left to die on the beach.

> *"The problems we are having here [in La Barca] with the lack of fish and the shrimps is because the larveros from Olmedo and La Tola. They kill everything, have you seen them, they get all this mix of baby fish and shrimps, they take the patiblanco[88] and the others are left to die in the beach, is very sad. We think Caza y Pesca [The fisheries department] should forbid that activity or impose fines, it is a waste and then we all pay for it"*
> (Francisco Tenorio, La Barca fisherman, interviewed December, 2002).

The impact of this new activity has not been assessed, so there is no regulation of the size of the nets used, the number of fishermen, or the area they can fish. In communities like Olmedo more than 150 of this new type of gear can be found (FEPP-Manglares& INP 2002).

From my observations in the study area I would argue that several changes such as the opening of roads, and the introduction of new materials are leading to changes and loss of knowledge about the artisanal fishery and the mangrove ecosystem. The introduction of nylon nets for example has led to the decreased use of mangrove tannins for dying and strengthening. Also new nets have led to the introduction of new fishing devises and practices, resulting in the loss of their knowledge about old fishing practices. Old fishing devices such as *calandras*[89], and *catangas*[90], were very selective gears, which caught only medium and large sized fish. They required a very specific knowledge of fish habitat and behaviour; also they were deployed at specific tidal times. Currently they are seldom used or seen, old fishermen complained about the fact that these good fishing devices are not

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[88] Local name the specie of shrimp good for shrimp farming
[89] Fixed line with baited hooks, use to fish for big groupers and cat fish.
[90] Traps that according to where they are deployed can catch fish or crabs. They are constructed using a local type of straw.

longer used, and the know-how is being lost (see for example chapter 7, section 7.3.2). The fishing nets currently in use do not have the same capacity to discriminate and they can be deployed anywhere and at any time. Because so many species are targeted at the same time, fishermen do not need to know about fish habitats and behaviour. As will be explored in chapter 5, section 5.1, some of this new fishing gear is considered destructive, and people blame it for the decrease in fish and shrimp. Changes in the commercialization of fish (due to the easier availability of ice) have also led to knowledge loss. Before ice and outboard motors, fish was sold clean and dried (*escalado*), now fish are sold whole, so there is no need for cleaning. Lots of important information gets lost with this practice. When fish are cleaned, the fishermen learn a lot from the gut contents and gonad maturity. They could recognise where they were feeding, recognised reproduction stages, and see any diseases they were suffering[91] from.

Although it is possible to identify changes and loss of knowledge in some areas, we can see throughout the above sections and sections 4.3 and 5.3 (in chapter 4) that there are still important knowledges in the area. Mangrove dwellers have a different way of interpreting their world, with the moon, low tides and high tides playing a very important role. In the daily interactions with the ecosystem people are creating new knowledges that have continuities with the past and are important for the sustainable use of mangroves today. We also need to understand that REMACAM communities are not isolated anymore; there are many new external forces that in many cases are changing the nature-human relationship. To be able to sustainable use and manage mangrove resources, communities and organizations need to be aware of these changes, and need to develop integral management strategies where local knowledge, perspectives and experience are at the core, but can be helped with information, and tools, that allow them to adapt and to survive without jeopardizing their natural resource base.

5.5.2 The arc cockles gathering world

> *"La concha, la concha es nuestra vida, la concha la concha es nuestra vida, saque la grande saque la grande, deje la chica para que crié*[92]" (song composed by Uberliza Bustos, Santa Rosa community)

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[91] These observations are based on my previous work with fishermen communities in the mangrove areas in Colombia with whom I lived for more than five years.

[92] "The cockle, the cockle, that is our life, the cockle, the cockle that is our life, take the big, take the big leave the small so it can reproduce". This is a traditional type of song are call "arrullo".

5.5.2.1 Cockle gathering along the Pacific coast

Mangrove cockles, (also called arc cockles or arc shell) are harvested commercially and as subsistence food by large numbers of artisanal fishermen along the Pacific coast from Mexico to Peru. This bio-geographic zone is known as the Tropical East Pacific Region and comprises ten different countries and extends for 6,350 km. The importance of this fishery has always been overlooked by the governments so there is no reliable information or statistics about the fishery in any of the 10 countries. According to some researchers in Ecuador, *"cockle gathering is considered a second class activity, and that is one of the reasons there is not much information or research about it"* (Juan Moreno, National Institute of Fisheries and cockle researcher, personal communication, 2003).

One of the only published papers on the state of this fishery is MacKenzie (2001), in which he found that there are at least 15,000 cockle gatherers in the tropical east pacific region. However due the lack of reliable information this assessment is not complete, for example, Mackenzie reported 5,000 gatherers in Colombia yet according to information collected by the WWF there are at least 6,200 gatherers in the south of the country alone[93], also in Costa Rica INCOPESCA has 800 cockle gatherers registered up to 2005 (INCOPESCA 2005). So, adding this to what MacKenzie found, we can argue that there are at least 16,400 fishermen actively participating in cockle harvesting in the region, making it by far the most important commercial mollusc fishery along the American Pacific coastline. Table 5.6 shows the estimated number of cockle gatherers by country, the table includes data from Mackenzie, with updates from WWF (2004) for Colombia, Ortega (2004) for Ecuador and INCOPESCA (2005) for Costa Rica.

In the countries where cockles are harvested, the mangrove cockle fishery shares some characteristics. First, the cockles are harvested singly by hand, and there are no reports of mechanical techniques to gather cockles. Gatherers wade across the sticky mud digging between the prop mangrove roots and keep their catch in string bags or plastic buckets. Second, the gatherers are normally poor and live in small isolated coastal villages where access to services is minimal. According to Mackenzie's research, along the Pacific coast from Mexico to Peru, at least half of the gatherers are women and children as young as seven participate in the gathering. They travel almost daily from their villages to the

[93] According to reports from WWF (2004) there is at least 6,200 families in the south (Santinga-Tumaco area) that depend on cockle gathering, this number does not include the north (Cabo Corrientes-Buenaventura). MacKenzie 2001 reports 5000 gatherers in the whole of the country.

harvesting areas in wooden canoes and fibreglass boats, at low tide when they can walk into the mangrove swamps to harvest the cockles. In all these gathering communities' mangrove cockles are a very important part of the daily protein intake. Third, the gatherers sell the cockles to middle-people (normally from another big town), who sell them mainly whole to market outlets in larger inland towns within their countries, or are exported to adjacent countries, thus making a profit that can be as high 1015% (MacKenzie 2001).

Table 5.6 Countries that harvest mangrove cockles and their estimated numbers of gatherers

Country	**No.**
Colombia	6,200
Ecuador	5,055
El Salvador	2,850
Costa Rica	800
Mexico	645
Guatemala	235
Honduras	225
Panama	220
Nicaragua	160
Peru	75
Total	16,465

Source: adapted from MacKenzie (2001) , WWF (2004) and Ortega (2004), INCOPESCA (2005).

Except in Mexico, all along the American Pacific coastline the mangrove cockles are under heavy harvesting pressure (MacKenzie 2001). One of the major problems for the cockle fishery is the destruction of the cockle gathering grounds. This destruction is normally due to the increase of shrimp farming, even though an acre of cockle habitat produces almost twice as much meat weight as an acre of shrimp pond. The fact is that shrimps are more valuable than cockles kilo for kilo, they can be mass produced, and therefore cockles are not considered an important fishery along the pacific coast, and so it makes economical sense for governments and developers to oversee the cockle fishery value when comparing it with other uses.

5.5.2.2 Cockle gathering in Ecuador

From table 5.6 we can see that Ecuador has the second largest tabulated number of cockle gatherers in the region, 5,055 (31% of the total number). Table 5.7 shows the distribution of the Ecuadorian gatherers according to the area.

Table 5.7 Ecuadorean cockle gatherers by area

Area	**No. gatherers**	**%**
Esmeraldas Archipelago	4000	79.00
Muisne-Canaveral	130	2.60
Sabana Grande-El Moro	35	0.69
Isla Puna	90	1.78
Jambeli Archipelago	800	15.83
Total	5055	100.00

Source: Adapted from MacKenzie,(2001)

Making a more detailed analysis of this table, it will be seen that the major number of cockle gatherers can be found in what MacKenzie calls the Esmeraldas archipelago (which is basically the REMACAM area). With the exception of Jambeli[94], there are almost no cockle gatherers in the rest of the Ecuadorean coast. This is quite significant if we look at the distribution of mangroves along the Ecuadorean coast. According to CLIRSEN, 56% of the mangroves lay harboured in the Guayaquil gulf. When the percentage of cockle gatherers is compared with the percentage of mangroves in each coastal area, we can see a very interesting trend (see Figure 5.2). Although the major percentage of mangroves is found in the Guayaquil area, it only harbours 1.78% of the cockle gatherers. Whereas in sharp contrast, 79% of the gatherers are found in the Santiago-Mataje which harbours only 11.28% of the mangroves. In the graph the data is purposely presented with a geographical perspective, Pagua-Arenilla is in the south of Ecuador and Santiago-Mataje the north, we can see how cockle gatherers are basically lumped in the north around the border with Colombia. The most reasonable explanation for this phenomenon can be found in the fact that the majority of shrimp farms in the country are found in the south, and as has been explain in chapter 2, the industry has moved up the country and the REMACAM area is the last remaining fully functional mangrove in the country and also judging by this graph, the last remaining place for cockle gatherers.

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[94] This area is close to the other Mangrove Ecological Reserve (Manglares Churute)

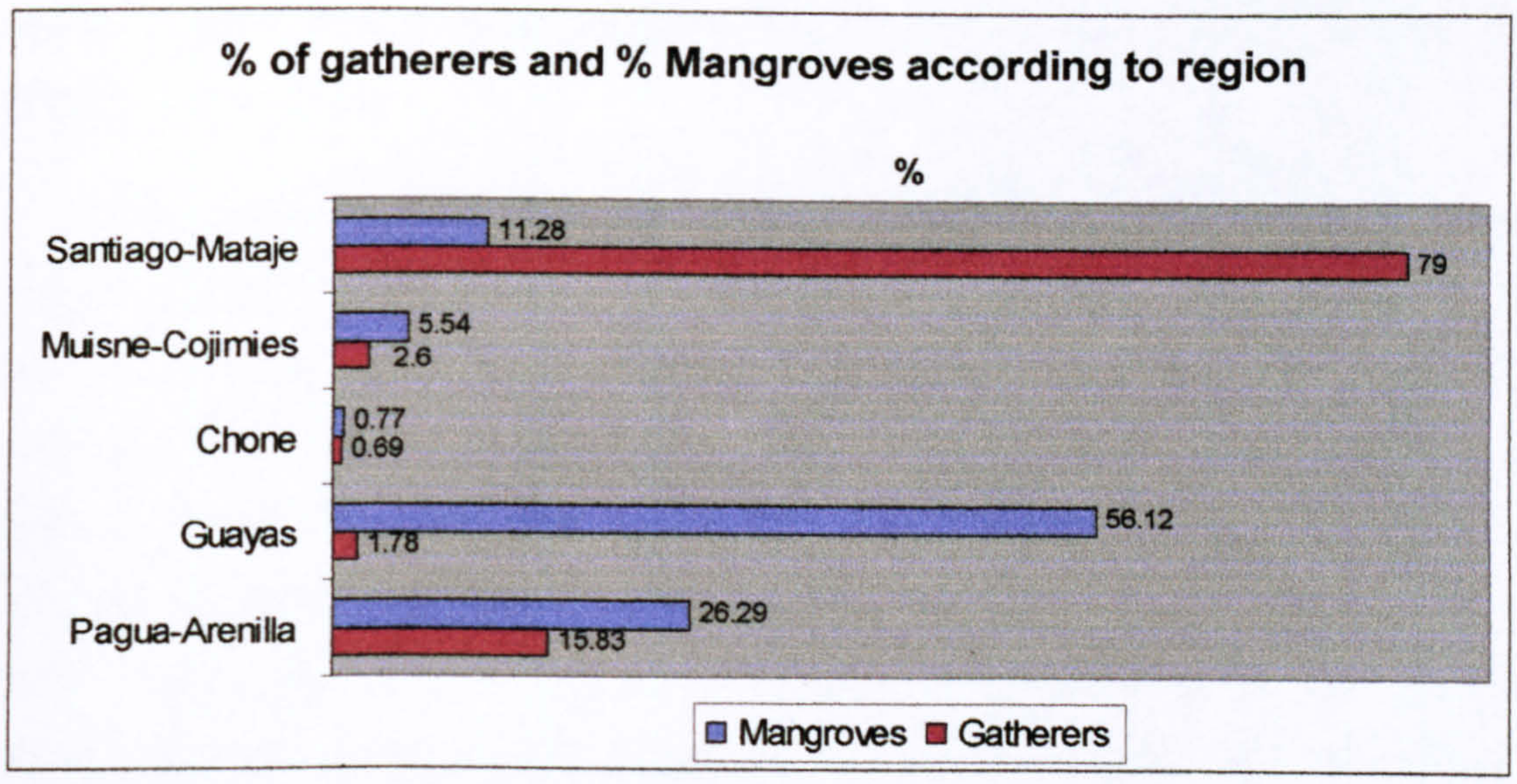

Figure 5.2 Percentage of cockle gatherers in the country compared with the percentage of mangroves in each coastal region.

5.5.2.3 Women and cockle gathering

Cockle gathering is essentially a woman's and children's job. One of the reasons for this is the fact that cockles are singly picked by hand, and so there is no need for capital investment. Also the gathering areas are close to the communities, allowing the women to take their children with them, making cockle gathering easily combined with house work and other chores[95]. As analyzed in chapter 4, section 4.4.2, the cockle gathering activity is totally dependent on the rhythm of the tides. Low water, high water, spring and neap tides are the most important elements of the working cockling day. Typically, cockle gatherers row to the gathering grounds in small wooden canoes (*potros*). Each *potro* carries 2 adults and one or two children, normally there will be 3 or 4 canoes going together to the same area (see section 5.5.2.6). The *concheras* leave their houses at least two hours before low tide, so they can arrive at the cockle grounds well before the water finishes going down (this is locally called the *mareita*[96]). This arrangement gives them the maximum time to gather the cockles. They harvest cockles for at least four hours at a stretch, before the water covers over the grounds. Every other week, the first and second day of *puja* (refer to chapter 4, section 4.4.2) allows for two harvesting times. They go very early in the

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[95] Methodological note: Information for this section was gathered using personal observations and informal questioning when accompanying cockle gatherers during their gathering trips. Information was also colleted at cockle gatherers' informal talks during the high tide when the women got together to talk about their gathering trips and what was happening in the community.

[96] "Mareita" is an cockle gatherers term, that refer to the specific time when the water is still going down, but soon will turn around to start going up

morning cockle for four hours and then return to the cockle grounds in the afternoon for another 4 hours work.

The gatherers are barefoot and women normally wear short skirts or short pants and sleeveless t-shirts (see Figure 5.3), which seem inappropriate for repelling mosquitoes and other insects, but makes sense, when you need to move between the mangrove roots and mud, the more clothes you have on the more difficult it is. Gatherers normally collect cockles barehanded, but I have noticed that in some of the communities (Tambillo, San Antonio) younger gatherers have started using plastic gloves (kitchen ones). This is not very common however, as the gloves come from the capital and can be expensive and additionally they do not last long as they get damaged by the sharp edges of fauna growing in the mangrove prop roots.

Figure 5.3 Cockle gathering among mangrove roots in the REMACAM

Cockle collection is an onerous task but does not include heavy lifting or manual labour. However this does not mean that it is easy work. When the gatherers are in the mangroves they are not just exposed to the insect bites but also to benthic poisonous fish (peje-sapo and vieja[97] are the most common). When the gatherers tread on them, the fish

[97] *Batrachhoides* sp and *Halichoeres dispilus*

dorsal fin pierces their skin producing pain, inflammation and paralysis. Sometimes when gatherers put their hands in the caves they are inhabited by other animals like mud-crabs (*jaibas*) that hurt the gatherers hands. These wounds normally get infected (due to the muddy surroundings) and in many cases put the gatherers out of work for several days.

One of most problematic things for the female gatherers is the fact that they spend hours on end in the mud, sometimes they are covered in it. What is especially worrying is that because they are nearly buried in it, the mud decreases their body temperature. In workshops and informal talks, the *concheras* complained about respiratory diseases, recurrent flu, rheumatism, skin infections and uterine and vaginal infections. The long number of hours spent in the mangroves with out access to food[98] also causes gastric problems.

The perception among female cockle gatherers is that they are the ones with major health problems in their communities. In group meetings and workshops they always spoke about the high number of spontaneous abortions and problems with pregnancy and birth. One of the gatherers in Santa Rosa told me:

> *"In one of my pregnancies, I could not stop gathering cockles as I was in charge of the family. One day I was gathering with my comadre and my other children and suddenly I felt a very horrible sharp pain in my tummy, I could not breath and almost fainted. When I looked I had lots of blood between my legs. We came back straight way to the community but there was nothing we could do, the baby was dead"* (Beatriz, Santa Rosa, interviewed on September 2001).

It is very difficult to identify a causal relationship between cockle gathering and the pregnancy and abortion problems as these can also be associated with under nourishment and/or other living conditions in the area. All the information I have on these issues is anecdotic. As there is no proper health service in the communities it was impossible to obtain a doctor's opinion or to check health records for the area. However this is clearly an issue of concern that needs further research.

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[98] Due to the muddy conditions in the mangroves it is impossible to cook or to eat when you are gathering cockles. This is different to fishermen, who normally have a packed lunch, provided by their conchera wives, when they are fishing.

To summarize, according to researchers and technicians working in the area, cockle gathering is not seen as a difficult job, onerous yes but not difficult. Gatherers do not need to expose themselves to the open sea, so there is no danger and *pejesapo* and *vieja* do not kill, they are painful yes, but not a big problem. Mackenzie (2001, p.14) for example describes the cockle gathering as quite nice (apart from the mosquitoes): "but air temperatures are moderate under the mangrove canopy". This view clearly contrasts with the way female cockle gatherers see their work and indicates the gendered dimensions of insider and outsiders views of the mangroves.

5.5.2.4 Cockle gathering as an economic activity

Cockle gathering is not only essentially a women's job, but is also the most important economic occupation for them in the REMACAM area. As an economic activity, cockle gathering is the second most important natural resource extraction activity in the area and it accounts for more that 25% of the income generated by fishing. In terms of the number of people it employs, cockle gathering is the largest resource extraction activity, at the moment circa 2500[99] people collect cockles for sale in the REMACAM.

According to the SES, cockle gathering is the most important female activity in the study area. Of the 99 households that reported cockle gathering as a main economic activity, 82.4% of the gatherers are female. In addition to the female gatherers, there are also another 2.4% of women who buy cockles to sell to external middle-people. Table 5.8 shows all the female activities reported by in the SES.

Cross tabulating the information from the SES, I found that the 20% of female headed households, depend almost exclusively on cockle gathering and for 10% of mixed-head households both husband and wife gather cockles as the main, and in some cases, the only economic activity. Cockles are gathered for subsistence by 16% of the households in REMACAM. It is always important to note that during cockle gathering other species of mollusc are harvested, although these do not have a market value, they are used to provide protein for the household.

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[99] This number does not include cockle gatherers from San Lorenzo or Limones, in 1998 GEF-INEFAN reported 1500 cockle gatherers based in San Lorenzo (GEF-INEFAN, 1998).

Table 5.8 Female activities reported in the SES

Activity	**No.**	**%**
Cockle gather	97	57.06
House work	27	15.88
Corner shop	11	6.47
N/A	8	4.71
No females in the house	6	3.53
Buy cockles	4	2.35
External help	4	2.35
Female ill	3	1.76
Business	2	1.18
Cook (or sell food)	2	1.18
Agriculture	1	0.59
Dress maker	1	0.59
Communitarian mother	1	0.59
Nurse	1	0.59
Shrimp farm	1	0.59
Teacher	1	0.59

Source: fieldwork, 2002

5.5.2.5 Selling the cockles

The mangrove cockle business started to grow in the 1960s, when the travel by land between San Lorenzo and Quito became regular and reliable due to the construction of the Ibarra-San Lorenzo railway. Before this, the cockles were a coastal business; they used to be taken by haulage boats to Limones, Esmeraldas, Manta, Salinas and Guayaquil (all coastal cities). But with the arrival of the railway the *ceviche*[100] of cockles (until now a coastal speciality), became very popular in the restaurants in Quito and other big cities in the sierra. The appetite for cockles has grown steadily over the years and it is now possible to find cockle dishes even in small and middle size restaurants in almost all the sierran and Amazonians cities. The cockles gathered in the REMACAM area are taken to San Lorenzo and from there they are dispatched to Ibarra and Quito. With the opening of the San Lorenzo to Esmeraldas road and the diminishing number of cockles collected in the

[100] A South American appetizer in which fresh raw cockles are marinated in lime juice to "cook" them, along with onions and other herbs.

south, there are more and more cockles being sent to the southern cities of Manta and Guayaquil. These cities are now becoming some of the best and most secure markets for the REMACAM cockles (Juan Moreno, National Institute of Fisheries and cockle researcher, personal communication, 2003).

Three cockle species (*Anadara tuberculosa, A. similis and A. grandis*) are gathered in REMACAM. *A. tuberculosa* (locally known as female cockle) is the most abundant species in the muddy areas around the mangrove roots. Due to its high abundance and its fortitude (it can stay alive up to 8 days after harvest), it is the most commercialised species in the area. The shell of *A. similis* (locally known as male cockle) is thinner, so that makes the animal more fragile and difficult to transport. A grandis has a much larger and heavier shell making it very difficult to transport, so it is normally collected for local subsistence as there is no market for it. Cockles are sold by "*cientos*" (units of one hundred shells) and with *A. tuberculosa* fetching up to $3.5 per *ciento*, cockle gathering can provide a substantial household income, see table 5.9. Due to its better value, at least 98% of the *A. tuberculosa* is sold, whereas at least 55% *A. similis* is kept for home consumption.

Whilst cockles bring in considerably less money than fishing (see section 5.5.1), it is a vital means by which a woman can support her family. It is also seen by local communities as an insurance option because cockles show no market seasonality, so that in times when the other fishing activities are poor, cockle gathering will provide the income to cover household expenses and important protein for the daily diet.

Table 5.9 Income generated from mangrove cockles in REMACAM in 2002.

Sp	Averaged collected per week	Average sold per week	Average consumption per week	Price per ciento (US$)	Weekly income (US$)
Anadara tuberculosa	928	909 (98%)	19 (2%)	3 to 3.50	27.3 to 32
A. similis	307	137 (45%)	170 (55%)	2 to 2.50	2.8 to 3.4

Source: Adapted from Preliminary FEPP/INP report (2002) and fieldwork data

The commercialization of the cockles shows the complexity of the gender relations and how this influences the use of natural resources. When you sell, it means that you need to negotiate, a price or better conditions, the relationships here are interlinked with power conflicts in which not all actors have the same power. It is unusual for the cockle gatherers

themselves to sell the product in the big cities. There would be many obstacles to over come. The first one is the capital to do it, they need to have money to pay the gatherers, then to transport the cockles from the isolated communities to San Lorenzo and then from there to the big cities. This will require enough money and time to get away from the communities. As women have responsibilities in the house with children and husbands, it would be very difficult for them to take on such a role. Instead cockles are normally sold to external middle-people, who visit the communities regularly to buy the cockles, take them to San Lorenzo, and from there they are sent to the sierra. The price of cockles in San Lorenzo is normally one dollar higher than in the communities (per *ciento*), and the same 100 units in Quito o Ibarra will be six to seven dollars.

5.5.2.6 Cockle gathering as a group activity

Traditionally cockle gatherers work in groups of 5 to 8 women and some children. Generally there is a family relation between the women. According to the research, 51% of the cockle gatherers interviewed gather cockles with relatives. The most popular groups are daughter and sons with cousins and family in laws following in popularity (see table 5.10). Normally the women belong to the same household but I also found women of other household units, where the relationship is normally of very good friendship or they are neighbours.

Table 5.10 Group gathering preferences in the REMACAM

Who do you gather with	**%**
Family	51
Friends or neighbours	34
Alone	17
Big boat	7
Rent "potros"	2

Source: fieldwork, 2002

A surprising result was the fact that 17% of the cockle gatherers interviewed said they gathered cockles on their own (see table 5.10). This result is important because it is the first time cockle gathering has been reported as a lone activity. According to the known literature, cockle gathering is always a group activity, unlike fishing where it is normal to fish alone. Cross-tabulating the information on lone gatherers I found that the major percentage of people gathering on their own are men. They normally go in their small

wooden canoes (*potros*) alone and try to do some fishing on the way back from the cockle grounds. Other male gatherers interviewed gather with their wife and children, but seldom as part of a group of friends or neighbours. We found only one man who gathers cockles as part of a *concheras* group. This is a new way of gathering cockles in the mangrove communities, which show some of the social changes that are occurring in the area. One of the most important implications of these social changes is the impact on transfer of knowledge about cockle gathering, e.g. which other species can be collected to eat, and where the best grounds are. Children normally learn to cockle gather by imitating their mothers or older siblings. Also during the cockle *faena* women sing and improvise new traditional songs (arrullos[101]) and interchange ideas about what is happening in the communities. The cockle *faena* is not only an economic task but a cultural and social space where children learn from their elders and women hone their singing and improvising abilities. When men go on their own to gather cockle the transmission of knowledge about the cockles and the cockle's habitat is interrupted and also the social and cultural aspects of the fishery. Such aspects are vital in maintaining the cockle fishery and the livelihoods associated to it.

Another interesting finding from this research is the increasing percentage of people gathering as part of a big group. These are usually young men, travelling in large fibre glass boats with powerful outboard motors. These are improvised groups: the owner of the boat takes them to the cockle grounds and then buys the cockles they harvest at much lower than the market value. The gatherers in these groups do not need to make any investment and after the gathering have no obligation to the boat owner. These young men have been displaced from their traditional logging jobs, as the logging companies are going out of business due to the rapid development of African-palm plantations. The groups are attracted to the cockle fishery because there is no need to invest in any equipment, and because the mangroves are open to all. The cockle gathering grounds are perceived by these itinerants as a free common resource. In some communities traditional gatherers are being displaced by these big groups. Section 5.6 (below) will examine the consequences of this new gathering practice.

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[101] Arrullos are traditional songs always sang by women. Women use old one's but improvise on new ones to tell about recent events in the communities and in the area. They are normally sung during gatherings such as christenings, burials, communal parties. As such they are part of the transmission of local knowledge.

5.6 Changes in resource allocation and practices

As explained above, 17.6% of the cockle gatherers are male. This percentage refers to men that gather cockles as a main economic activity, and it does not include occasional gatherers or male children and youngsters that gather cockles with their mothers. According to the interviews, men have taken to cockle gathering because they do not have any other source of income. In communities, such as Tambillo and Pampanal, men have been displaced from agriculture after selling their pieces of land to the shrimp farming industry. Cross tabulating the information on male gatherers it was found that 26% of them come from Tambillo and 21% from Pampanal, the communities more affected by the shrimp farming industry. So, we can see here the effect of the shrimp farming industry on those communities. Another reason given by male cockle gatherers is that their small farms have been flooded when shrimp ponds were built, so they need to look for alternative economic sources. It is the same with people that can not travel to their agriculture plots as some of the creeks and estuaries are now guarded by armed men with dogs paid by the shrimp farms. Some of the men, used to work for logging companies that have closed due to the African palm plantations. Other male gatherers are fishermen that can not fish any more due to the decrease in fishing in the area and the high cost of the fishing gear.

Armed men with dogs not only control people travelling to their small plots of land. In the communities closer to shrimp farms the majority of cockle gatherers interviewed reported encounters with armed men and dogs, which excluded them from traditional cockle grounds, and in several cases, some of the women and children have been threatened by the weapons and the dogs. These practices can be easily observed when travelling in some areas of the reserve. Several estuaries and small creeks have been sealed off with "no entry" and "private property" signs. Limiting the access to gatherers results in a concentration of gatherers in certain areas; this increases the pressure on the cockle resources and causes conflicts among gatherers from the different communities.

The problems caused by the exclusion from traditional gathering grounds are exacerbated by the influx of new itinerant cockle gatherers. Customarily, each community in the REMACAM area has specific gathering grounds, which were respected by the other communities, also traditional cockle gatherers used small wooden canoes with paddles, which do not allow them to go too far from the communities and because women, were the traditional gatherers they prefer gathering grounds close to their communities. Local

gatherers used to rotate the grounds leaving some areas alone for a couple of weeks, so the cockles could recover. Among other traditional techniques employed by the women is that of leaving the "mother" (brood stock), so it can reproduce, and they also leave the small shells (less than 4 cm) in the grounds.

With the use of outboard motors it is easy for the new gatherers to go any where in the reserve, and, because they do not belong to any of the traditional communities, there is no communitarian pressure for them to use specific gathering grounds. They argue that mangrove areas belong to all Ecuadorians and because of that, they are allowed to gather any where they want. The other problem is that this new generation of gatherers use machetes to cut the mangrove roots, making it easier to gather cockles but destroying the gathering area. According to local people, and my personal observations, it takes more than 2 months for the grounds to recover after new gatherers have been there, and in some cases, mangrove trees have fallen due to the damaged roots.

The most important impact of these new gatherers is going to be the long term impact in the cockle fishery, as the new practices do not leave brood stock, or small animals. New gatherers take everything they find, and they tell the traditional gatherers that they do not know how to gather as they are always leaving cockles behind! With the new practices of taking all animals, including brood stock the natural re-stocking will be slower or no longer take place. The other problem is that areas that were inaccessible before are being accessed and gathered. As these areas act as replenishing grounds for the reserve cockle populations, their disturbance will have a huge impact on the resources.

The perception that cockle resources are decreasing is being corroborated by a monitoring programme started by the mangrove project and the local communities in 2001. According to preliminary analysis, the size of the harvested cockles is getting smaller and also their abundance is decreasing. Traditional gatherers are travelling further to get to the gathering areas and some of the traditional grounds are not longer productive (FEPP/INP 2002). Another problematical trend identified by the monitoring program is that in communities such as Pampanal and Tambillo the number of cockle gatherers has increased in the last two years. Also very worryingly is that more than 60% of the cockles collected in those communities are under the recommended minimum collection size (Ortega 2004). These findings are a clear indication that the cockle resource is under pressure in the study

area. It is important to note that this monitoring does not include the cockle gatherers based in San Lorenzo or Limones, and that their impact on the fishery needs to be assessed: they need to be included in any type of management strategy as they could be causing considerable damage to the fishery.

This pressure is increased and at the same time caused by the destruction of gathering grounds by the shrimp farming industry. As mentioned in chapter 4 (section 4.5.1), even though there are more than 3,000 ha of shrimp farms in the area, the employment provided by them to the local communities is minimal. Conversely, as we have analysed here the impact of the shrimp farms is great, not only do the gatherers have to cope with the physical destruction of the gathering grounds during the construction of shrimp ponds, but the sealing off of estuaries and creeks and the displacement of traditional inhabitants from other economic activities such as agriculture and fishing. Also, communities close to the shrimp farming areas are affected by the pond effluent that is discharged directly into the adjacent estuaries. During workshops and informal talks, local dwellers reported several cases of massive fish and crab mortality, all of which according to them, were related to pond discharges. There is no research done in the area to verify the claims but as we analysed in chapter 2, section 2.3.1, research in other countries suggests that pond effluents discharges can produced serious and critical degradation of water quality in the adjacent estuarine waters (see for example: Paez-Osuna 2001, and Rönnbäck 2002).

With low investment costs for cockle collection, increased numbers of people displaced from other traditional economic activities and few alternative income sources, coupled with the perception that the cockle gathering areas in the REMACAM are open-access resources, cockle collection is likely to continue to attract more new entrants into the activity. The cockle fishery is absorbing the surplus labour from elsewhere in the economy and this is leading to its further deterioration. A decrease in the cockle fishery would weaken its poverty alleviation and food security function, affecting the most vulnerable groups in the area: female headed households and the old people. Also the changes in the traditional cockle gathering practices will lead to a loss in knowledge transmission and the loss of the cultural and social aspects to the fishery that have until now made possible its sustainable use and management. These are concerning trends for

the REMACAM given the area's role as an example for mangrove management and defence for the rest of the country.

Chapter 6 - Conceptualizations and property regimes in the Ecuadorian mangroves

6.1 Introduction:

To understand the history of mangrove use, management and its defence in Ecuador, we need to understand how mangroves have been contextualised, and how these conceptualizations have evolved and changed over time, especially in the last few decades. I argue that different constructions and perceptions of mangroves have co-existed since the arrival of the Spaniards in Latin America. Mangroves have suffered a series of incarnations in the popular imagination, and it is possible to recognise a historical dichotomy in the way in which mangrove ecosystems have been conceptualized, this dichotomy can still be observed in Ecuador. Cultural representations of mangrove are playing a very important role in the way they are managed and defended in the country. Section 6.2 will explore mangrove outsider and insider perspectives and the way they have shaped the mangrove's demise and defence in the country. It will examine how the mangrove defence movement has taken the insider view to the national and international arena and how the binary opposites are represented and idealised.

Successful use and management of natural resources, such as mangroves, is fundamentally determined by the institutions and property rights associated with them. Thus an understanding of the property regimes under which these resources are normally managed is essential in identifying how institutions and property regimes have shaped the way resources are used or abused. For example, one of the reasons given for mangroves' depletion around the world is the lack of clear property rights, and the fact that they are normally considered an open access resource. Section 6.3 will explore the different commons property regimes and the way natural resources such as mangroves are managed under those regimes. The difference between common property and open access regimes will be explained and the tragedy of the commons paradigm will be analysed. The reasons for the current prominence of community based approaches such as co-management will be presented in section 6.3. 3.

With these elements in mind we will then move onto section 6.4 where the institutional arrangements for mangrove management in Ecuador will be analysed. Mangrove laws and regulations will be explored in order to identify the way in which the legal framework is

being used and abused by different mangrove stakeholders. Throughout this chapter we can see how an outsider system of arguments and interpretations have shaped policy, regulations and practices affecting the way mangroves have been used in Ecuador, and have also made possible the development and expansion of the shrimp farming industry at the expense of the mangroves. The chapter also explores how the insider discourse and narratives are now being used successfully to defend the mangroves and their traditional communities.

6.2 Mangrove representation and conceptualizations

6.2.1 Different perspectives: outsider and insider

My first argument is that the arrival of the Spaniards in Latin America marks a departure point in the way mangroves were used and perceived, as explained in chapter 4, section 4.3.2, to the Spaniards the mangroves were muddy, dangerous, mosquito ridden places. They did learn the value of some mangrove products such as wood, but they never understood mangroves as an ecosystem. One of the reasons for this, is that they never lived within the mangroves. This was the beginning of what I call the "outsider perspective". On the other hand, we have the black slaves escaping from the mines and *haciendas*, for them mangroves were providers not only of refuge, but also of many other goods and services. Even though initially they were outsiders, in their daily interaction they became the insiders. These initial encounters have created two contrasting perspectives on the same ecosystem. My argument is that each perspective has a series of characteristics that are still possible to identify today. Table 6.1 shows the characteristics of outsiders and insider perspectives of mangroves according to my arguments and based on my experience working in the mangrove ecosystems.

My second argument is that, these two opposites have shaped the way mangrove ecosystems have been administered and managed. The outsider was never tempted to go and live in the mangroves (it was dangerous), and because they had the power and the money, they used mangroves only as a source of either wood or bark or cheap land (as in the last four decades). A very good illustration of this view is the way mangroves have been exploited. When mangrove bark was in demand, the wood was not used, the trees were stripped for their bark, and the wood was left in the fields to rot. Then, when wood was in need, they did not use the bark. This is a very good illustration of how mangroves

are perceived from the outside, as the provider of only one type of product, the outsider never understands mangrove as an ecosystem, sustaining fisheries and local communities.

Table 6.1 Mangrove conceptualizations in Ecuador

Outsider	**Insider**
Light skin	Dark skin
Power	Powerless
Urban	Rural
Dangerous, Mosquito ridden	Refuge, provider
Single use (bark or wood)	multiple use
Wasteland	Home
No-body's land	Everybody's land

Source: authors own

The two contrasting conceptions of the use of mangroves have created a dichotomy in the way mangroves are not only perceived but also managed in the country. The outsiders with the money and the power have dictated what type of product they require from the mangroves, and the insider has delivered the product. In a country with such a variety of valuable natural resources (oil, gold, rainforest, etc), mangroves have been a marginal resource, so their exploitation has not been the subject of strict regulation. It will be shown in section 4.2, that mangrove regulation has been reactive, and that nominally the government has been pushed to create it. When laws and regulations are written, they are written by light-skinned (*mestizo*) urban officers, sitting at their desks, so these laws and regulations are narrowly focused, following the outsider's perspective of the ecosystem.

6.2.2 Outsider's view and mangrove depletion

The outsider perspective that mangrove areas were mosquito ridden wastelands, in need of development, made it possible for these areas to be filled-up and used either to build houses or tourist developments. When the shrimp farming boom arrived in 1969, mangroves were the first candidates to be converted, as they were seen as nobody's land and lacking in value. The absence of rules and legislation about mangrove use or coastal development, made rich developers, and government officials, see a very easy and productive way to "develop" the mangroves. According to some reports, during the shrimp farming boom, mangrove land was given in concession to shrimp farmers for as little as 3 dollars per 2.5 acres per 10 years (Rice 1997). Lack of legislation and total

apathy from the authorities meant, that in less than 15 years Ecuador had the world's largest area under shrimp production (Tobey *et al.* 1998), all at the expense of the mangrove forest. The fact that mangrove outsiders have the wealth and power meant that the insider's view of mangroves was totally ignored during this development. For a full description of shrimp farming in Ecuador see Chapter 2, section 2.6. Section 6.4 will explore how mangrove legislation has reflected the outsider perspective, and made it possible for mangrove ecosystems to be depleted during the shrimp farming boom.

6.2.3 Conceptualizations and mangrove defence

The cultural representations, and conceptualizations, of mangrove ecosystems, are playing a very important role in the way that mangrove defence is conducted in Ecuador. Conscious of the contrasting mangrove perspectives in the country, FUNDECOL, and the C-CONDEM, are opposing the current laws and legislations about mangroves, because they present a single-sector view of mangrove ecosystems, and have *de facto* made the mangrove ecosystem an open access resource, leaving it vulnerable to damage and destruction (see section 6.4.2). They believe that up till now mangrove laws and legislation have been contradictory and lacking communitarian participation. As part of their strategy to protect the mangroves, with the participation of traditional mangrove communities, they have written the first communitarian law for mangrove management and defence (see chapter 7, section 7.3.4). One of the most important aspects of the law is that for the first time in the Ecuadorian legal system, mangroves are presented as a holistic ecosystem, with multiple uses and resources, and as home for traditional mangrove dwellers and the basis for their livelihood strategies. Another point of departure is the fact that the new law includes community participation not only in its creation but also as the base for a new communitarian management system. Under the new law the local communities will co-manage and co-administer their mangrove areas. This is, according to C-CONDEM, the only way mangrove ecosystems, and the life and livelihoods of traditional communities, will be protected (FUNDECOL 2003b).

6.2.3.1 Recovering the insider's perspective: the work of FUNDECOL and the C-CONDEM

A very interesting question is, what happened to the insider's views, when mangroves were depleted during the shrimp farming industry's expansion? Why were local communities, and traditional mangrove dwellers, not able to respond to the shrimp farming

invasion? As during bark and wood exploitation, I would argue that outsiders imposed their view on insiders, and that due to the lack of voice and power, the insiders' view became basically lost for a long time. One line of reasoning that will be explored in chapter 5 is that some of the outsiders' perspectives have permeated into some segments of the mangrove communities, changing or at least blurring the insiders view. Another reason that will be explored in section 4.4 is outsider's power, translated into permits, concessions, powerful partnerships, laws and in many cases weapons.

During the shrimp farming development boom (1970-2000) thousands of insiders were displaced and became part of the urban poor (FUNDECOL 2000b). According to Yépez-Reyes (2004) during the 1980s several bloody battles were fought between the local communities and the shrimp farmer's guards, high levels of violence were accompanied by an increase in poverty and migration of insiders to the urban areas. Mangrove dwellers not only lost mangroves, they also lost their livelihood as cockles, crabs and fish also disappeared with the mangroves. They lost their access rights as estuaries and creeks were closed to local communities. There were some local protests, but no organised response against the industry. In 1986 in the Guayaquil area, (in the south of the country, where the shrimp farming boom started), the local environmental NGO (*Fundación Pedro Maldonado*) joined forces with a national ecology group (*Acción Ecológica*) and started an awareness program about the misuse of Ecuador's natural resources, particularly mangroves.

Then in 1989 the PMRC created the mangrove working group and started to work with the *Fundación Pedro Maldonado* in the implementation of a mangrove management strategy. Although on paper the strategy looked good, the strategy never worked, during 1987-1991 the rate of mangrove destruction actually grew by 37,5%[102] . There are two important factors to analyse here. First, the PMRC is a government program funded by USAID and implemented by the Coastal Resource Center (a Rhode Island University group). Second, they tried to implement an international strategy, based on integrated coastal zone management criteria, and relying on international experts, research, and special management areas.

[102] This percentage is calculated from the data the PMRC provides in Bodero, Robadue 1995.

USAID involvement in the mangrove management program was seen as quite contradictory; as explored in chapter 2, section 2.2.3, USAID is part of the international financial institutions promoting the development and expansion of shrimp farming around the developing world[103]. According to a mangrove activist the PMRC has not done enough about mangrove destruction

> *"in their more than 15 years and all the millions of dollars invested[104], PMRC has not saved a single mangrove tree. They believe the methods they applied in USA can be repeated here, but they are wrong, they have never really involved the local communities in their work and they pay for everything, the communities see them as part of the corrupt government and don't care about them. Sometimes they even damage some areas, as when they decided to pay 5000 dollars for 1 hectare of mangrove reforested, locals cut the mangroves and then replanted then so they could get the money"* (Lider Gongora, executive secretary of mangrove network, interviewed July 2002).

Another illustration of how local people in Esmeraldas see the PMRC is shown by Edgar Lemos, mangrove project director:

> *"they [PMRC] have a very small office in Esmeraldas staffed with people from the south. They never developed a relationship with the local communities and here in Limones people claims that they sold out to the shrimp industry interest during a dispute over a big shrimp farm construction back in 1994."* (Interviewed February 2002).

This is one of the reasons alluded to for the lack of a strong mangrove defence movement in the south of the country between 1969 and 1989. Here it is possible to recognise again how the binaries played a role in the mangrove defence movement. Groups such as *Fundación Pedro Vicente Maldonado* and the PMRC, are seen as outsiders, going into the mangrove and its communities with foreign ideas, and their own interpretation of

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[103] For example in Central America USAID funded a project aimed to recover the Nicaraguan shrimp farming industry (IFAS 2000). In Salvador USAID provided the financial help to FUSADES to introduce the shrimp farming industry in the country (RPI 2005). In the last few years USAID has partnered with Shell in Nigeria to introduce industrial shrimp farming into the Niger Delta, a project highly criticized by that country (EJF 2005a).

[104] PMRC stage I was supported by an Inter American Development Bank loan to the government of 16.5 million dollars, additionally 14.4 million dollars have been approved for stage II (IADB 2004).

mangrove ecosystems. I argue that this was one of the reasons the mangrove defence movement did not take off during this time, these groups and projects in some ways were imposing an outsider perspective of the ecosystem, and did not accommodate the traditional mangrove communities.

As was explained in chapter 2, section 2.7.1 the dynamics changed totally when the industry moved to the north of the country, because it faced the strong opposition from FUNDECOL. The difference with FUNDECOL is that they were the insiders, and they were defending their livelihood, this fact has always played a very important role in their movement, their strategy as shown before has been to defend mangroves using their insider perspectives and gaining the support of the local communities, as Lourdes Proaño, Lawyer and founder member of FUNDECOL recalls:

> *"In the beginning, we used our own resources to go around the estuaries to catch the illegal shrimp farmers. We replanted mangroves and we started talking to everybody in the communities to make them aware of the damage the shrimp farms were causing. It was not easy at the beginning but we persevered and here we are"* (interviewed May, 2002).

FUNDECOL has grouped together all types of mangrove resource users, charcoal producers, crab gatherers, arc cockle gatherers, and fishermen. They belong to black, *mulato* and *mestizo* families. In this sense FUNDECOL was not born as an external, ecological NGO, but as a reaction of local people worried about a very specific issue, the loss of their livelihood: the mangroves; "we were people of the same community fighting for the same local objective: the harmonious development of our communities" (Gongora 2000:1).

My key argument here is that because FUNDECOL has the insider perspective, it has been able to create a much stronger movement and get more results in terms of mangrove defence. FUNDECOL mission is: "To defend, rehabilitate and conserve the mangrove ecosystem and to support communitarian development" (FUNDECOL 2000d). From this mission statement, it is easy to see how FUNDECOL's strategy for mangrove defence has included the local communities and their development at the core of the mangrove defence struggle. It shows how they see mangroves not only as a fragile ecological ecosystem that needs to be defended, but also as a provider and the basis of community livelihoods. The

insiders see mangroves as a cultural niche, around which the communities have organised, and developed their special livelihood strategies and a specific cosmovision. This according to them, has resulted in a very special relationship between the mangrove and the communities. Mangroves are not only an economic resource but also a cultural reference point. These ideas are a good illustration of Escobar's arguments about how peasant resistance reflect more than the struggle for land and livelihoods; they also reflect a struggle for symbols and meanings, a cultural struggle (Escobar 1995). The objectives and projects they have set up look, for economic productive alternatives for the local communities, and to improve community health looking into traditional and preventive measures (FUNDECOL 2000d). All these elements have helped FUNDECOL to secure support from diverse groups of mangrove users, and has widened the appeal of the movement to cultural and ecological groups, in that way tapping into a wider national discourses of cultural diversity, collective rights and local participation.

Because FUNDECOL was at the centre of the creation and is an active member of the C-CONDEM (see chapter 2, section 2.7.1) all these elements have been transferred to the national struggle against the shrimp farming industry. Because C-CONDEM represents more than 100 grassroots groups and environmental organizations in the country, and has a very high profile in the international struggle against the shrimp farming industry, it has become the most important player in the national struggle to defend the mangroves. Currently it is also becoming an authoritative political actor in relation to environmental management in the country. Presently C-CONDEM is part of the first National Environmental Assembly (ANA), an initiative launched jointly by CEDENMA[105] and C-CONDEM after the ousting of President Lucio Gutierrez (April, 2005). This new environmental platform is demanding a better management of natural resources from the new president, and is also demanding a new, more sustainable, development strategy with proper mechanism for civil society participation (CEDENMA 2005). This shows how C-CONDEM has become a national player; and how the social capital accumulated in their struggle against the shrimp farming industry is translating into a form of political capital. It is important that through C-CONDEM the local communities are finally getting a voice.

[105] Ecuadorian Committee for the Wildlife and Environmental Defence

6.2.3.2 Taking the insider's view to the national and international arena

As detailed in chapter 2 section 2.7.2, C-CONDEM have created strong international alliances and is now, through the Mangrove Network, a key player in the Latin American movement opposing the shrimp farming industry. As discussed above they have created very important alliances at a national level. I argue that these alliances have provided power and voice to the insiders and have allowed C-CONDEM to take insiders' views to the government, and the national, and international arena.

I would suggest that these alliances have created another construction of the mangrove ecosystems. This new construction is a communitarian/environmental one, a mixed narrative, with elements of the insider and outsider perspectives, blurring the binaries about mangrove representation and construction. On one hand, there is the view that mangroves are complex ecosystems that provide several direct and indirect goods and services; they are providers and offer refuge not only to fauna but also to the local communities that depend on them. Even though international NGOs and some of the mangrove activists do not live in the mangrove areas, in their discourse they have incorporated these important aspects of the insiders' perspective. For example, see how the international resistance movement against the shrimp farming industry, uses the livelihood element as part of its strategy (chapter 2, section 2.5.1).

On the other hand, local communities and grassroots organizations have learnt to include new environmental words and concepts into their discourses. For example, in chapter 5, section 5.2 we see how local communities in the REMACAM, identified specific mangrove ecological functions such as nursery and feeding grounds, and the production of oxygen among the mangrove's attributes. They also talk about nature for debt swaps, the carrying capacity of the ecosystem and recognise the importance of the economic valuation of the ecosystem. All these concepts are obviously borrowed from the international environmentalist and development narratives.

In this new incarnation mangroves are being represented not only as a fragile, ecological ecosystem but also as a provider, the basis of coastal communities' livelihood. In this way, aspects such as food security, gender, social exclusion and ethnicity, that were never part of the environmental discourse, have now become very prominent. Both, communities and ecological groups, have included new perspectives and discourses in their

narratives, which has allowed the mangrove plight to be more widely understood and more widely defended. The REMACAM's creation and its functioning is the result of this new social construction of mangroves. The government was pressured by mangrove defence groups to give the REMACAM environmental status because of its environmental importance, but also because it was seen as a livelihood base for the traditional-local communities. In contrast to other natural reserves, the traditional-local communities in the REMACAM were allowed to stay, and now they are becoming the most important element in its management (see chapter 7, section 7.3.3 for a detail analysis).

The REMACAM is, in my opinion, the best example of how this new mangrove construction is having an effect on the way the mangroves are defended and managed. It is important to understand that, the new alliances and narratives have made it possible for the mangrove defence movement to establish an international platform, and at the same time have created a new political space of resistance, which includes challenging, and changing national legislation, and participating in the search for a more sustainable development strategy. The mangrove defence movement is in fact becoming a new development actor in the country.

6.2.3.3 Representing the binary oppositions

In the current discourse, shrimp farms and shrimp farmers have become the emblem of environmental destruction with impunity and corruption. They represent an unjust neo-liberal model that excludes people, destroys livelihoods, and alters food security. A very good illustration of how the shrimp farming industry is portrayed in this way can be found in the editorial of FUNDECOL's 10 year anniversary magazine "every day the voracity of the modern development (represented by the shrimp farming industry) exterminates our natural resources, displaces our communities and throw us into extreme poverty conditions" (Torres-Benavides 2000:I). The imagery is very important here, the shrimp farmers are always represented as very well dressed white people, urban outsiders who arrived in the rural coastal communities and destroyed them. For example, the magazine 'Impunity' (FUNDECOL 2000b) shows the chronological destruction of the mangroves in the Ecuadorian coast, under the title "the shrimp has eaten the mangroves" (see Fig. 6.1). The imagery used in this illustration is not casual, but rather shows the binary opposites again, the white/rich/powerful against the dark/poor/powerless.

Fig 6.1 Chronology of mangrove destruction in Ecuador, illustration from the Magazine 'Impunity' (Source: FUNDECOL 2000b)

An important aspect of this image is that the poor are represented with a female face. Hence this is another element that has played a very important role in the debate, the feminization of the mangrove. As a provider of food and shelter, the mangrove is portrayed as a woman, and as arc cockle gatherers are mainly females, the movement uses the female imagery very well. For example, the front cover of the FUNDECOL 10 year anniversary magazine, represents the mangrove as a voluptuous dark skinned woman (see annex VI). Female cockle gatherers are portrayed as well in several other bulletins and newspaper reports, including the front page of the special report produced for the national press for the mangrove day in 2002. This feminisation in the rhetoric of mangrove conservation draws again on another set of binaries, that of male/female.

These images are powerful representations and play a very important role in the way mangrove defence is conducted not only in Ecuador but also internationally. For example, Greenpeace Mexico produced a propaganda comic called the Maternity of the Estuary (Greenpeace 2002) and in it mangroves are depicted as the basis for the food chain in the sea, and the provider of goods and services for the local, rural communities. The comic tells the account of the introduction of shrimp farming industry in a small rural community in Mexico. In their story, they used some of the binaries that we have discussed above:

rich/poor, white/dark, urban/rural; the front page (see figure 6.2) is a very good illustration of some of these.

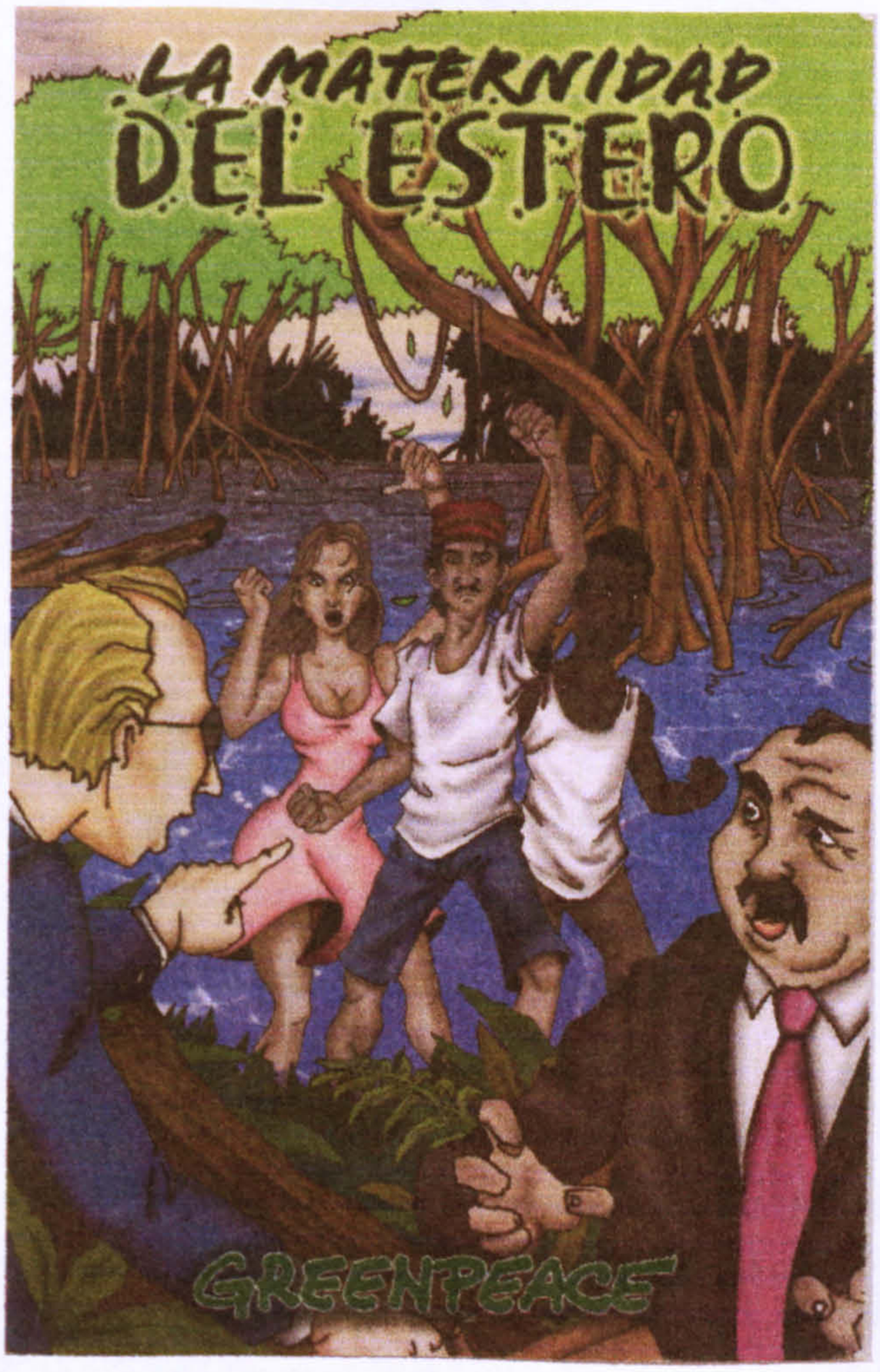

Figure 6.2 Front cover of Greenpeace propaganda comic the Maternity of the estuary (source: Greenpeace, 2002)

The environmental justice foundation, UK (EJF), also uses some of these binaries in their campaigns against the shrimp farming industry. For example, according to their campaigns, shrimp farming affects especially women: "Women's lives have been especially impacted as their access to resources and water has diminished. Women have suffered sexual abuse and violence in processing plants and at the hands of armed shrimp farm guards[106]". The front page of their "Smash and Grab" report (EJF 2003) shows a woman crying, and inside the report there are several photographs depicting women fighting against the shrimp farming industry. The EJF "Farming the Sea" report (2004) is dedicated to a woman (Kuranamoi Sardar), killed in Bangladesh, during a peaceful protest

[106] Source EJF webpage (EJF 2005b).

against the expansion of shrimp farming in her small village. In general, they portray farmed shrimp as a luxury item, consumed by the rich developed countries and produced at the expense of the poor people in developing countries, especially women.

Looking at the different campaigns and some of the research into the social consequences of the shrimp farming industry, we can see how the binaries rich/poor, foreign/local, male/female have become one of the most powerful representations in the struggle between local communities, and the shrimp farming industry (see for example: Shiva 2000, p.48). Dr. Jacob Raj (from the Indian PREPARE network) put it in very clear terms: "'It is a brutal process [shrimp farming] by which the protein is extracted from the poor people, and the land, which is owned by the poor people, and this extraction is to feed the bloated stomachs of the rich"[107].

6.2.3.4 Give us our mangroves back!

The new communitarian/environmental narrative is using some ethnic elements also. One of them is to claim ownership of the mangrove areas for ancestral users:

> *"the only thing we are asking is that they give the mangrove back to us, because mangroves have always been ours. We want to make it clear that for hundred of years the mangrove ancestral users have protected the mangroves and we always have enough food for the thousands of families living there"* (Santa Cagua, Coordinator Legal branch of FUNDECOL, interviewed May, 2002).

The 1999 mangrove defence campaign is a very good illustration of this feeling; firstly the name of the campaign "Give our mangrove back to us!", and then the imagery used in the posters, depicts a black old woman, helped by a child, bringing the mangrove back to the local communities. Also, the campaign was accompanied by the C-CONDEM proposal to the government to give the mangrove areas in custody to the communities for its use and protection (see chapter 7, section 7.3.3 for an analysis of the custodial process). The mangroves users claim the possession of the ecosystem as the basis of their livelihood strategies, and as a root to their cultural lives.

This argument is very similar to the argument used by the PCN in the north of the province (see chapter 7, section 7.3.1). What is interesting here is that C-CONDEM does

[107] Quoted in K. Parkins (2000) Tropical Shrimp Farms at HEUREKA (2000)

not talk about black communities; they talk about ancestral users and traditional communities. They are very clear that they are not an ethnic movement, but a communitarian movement. They recognise that not only black people depend on mangroves, but that *mulatos* and *mestizos* do as well:

> *"our movement is open to all mangrove dwellers and all the mangrove warriors, we do not mind the colour of the skin, we are worried about what is in the heart of the people, not what the colour of the skin is. We are worried about people losing their livelihood due to the powerful shrimp farming industry and the corrupt government. So we welcome all help from people who understand the real value of the mangrove ecosystems, people who understand that local communities need to live in the mangroves, that traditional users are part of the ecosystem and want to defend not only mangroves but also the livelihoods associated with them. White, mestizo, serrano, foreigners, engineers, biologists, sociologists are all welcome, because that helps our movement to be stronger and the message to get to more people"* (Lider Gongora, interviewed July, 2003).

Although these ideas tap into an intercultural, multi-ethnic vision of society, based on tolerance and inclusion, they have created some conflicts with the PCN. For the PCN the problem of mangroves is an ethnic problem, black people are the ones that defend and protect the mangroves and it is only through their black territory (see chapter 7, section 7.3.1), that mangroves and other natural resources will be managed in a sustainable way. Lider Gongora thinks that mangroves are a problem for all the inhabitants of the coast, independent of skin colour,

> *"Colour [of the skin] does not mean anything to me, look for example Don Eche, he is very white, but is convinced of the importance of the mangroves. He has lived in the mangroves for more than 30 years and he has been a brother in the struggle. I consider him a warrior, a mangrove person fighter, but the PCN has now decided that he cannot be part of their movement because he is white. I think the PCN is losing it"* (Lider Gongora, interviewed July 2003).

These arguments are echoed and supported by other groups and activists who think that 'black skin' does not automatically equate with love for the mangroves. Indeed, some

believe that black political leaders have been part of the mangrove destruction: "they really do the most damage to the people they represent. "They [African-Ecuadorian political leaders], are the ones who are partnering up with the shrimp farmers in Manabi, Guayas and El Oro" (Kate Cissna, from MAP, cited in Rice 1997:13).

One of the reasons alluded to by Marianeli Torres (Coordinator C-CONDEM and Mangrove Network) for the behaviour of some black political leaders, is the education system.

> *"Through the education that local communities received in the government schools other ideas and perspectives have permeated. Students are not taught about the importance of their mangrove ecosystems or their natural resources at all. They are taught that development means new industries and technologies. Somehow the school has taken the mangroves from the heart of some of the traditional mangrove dwellers, which is why we are trying to put the mangroves back into the heart of the people through our communitarian education program and through our national campaigns"* (interviewed, November 2002).

The C-CONDEM communitarian education program and ideas will be analysed in chapter 7, section 7.3.2.2. The idea is to re-establish the mangrove-community relationship in the areas where it is being lost; to put the mangroves back into the heart of the people.

> *"If mangroves are back in the heart of the people, if everybody realises how important mangroves are, they will defend them. They will protect them, and they will never allow the shrimp farmers to destroy the mangroves again"* (Marianeli Torres, interview July, 2002).

6.2.4 Representations or idealizations?

In the new discourses and narratives, local communities have become subjectified as the environmental good, with a purportedly unique mangrove management and local knowledge system that has allowed the mangroves to survive for the last 400 years. Local mangrove users are normalized as subjects in the conservation discourse, they are constructed as one of the two sets of the opposites, namely the good, the non-modern, the

non-commercial exploiters, paraphrasing Yapa (2001, p.43), they are described by what they are *not*.

There are some problems with this type of characterization; firstly it carries a set of restrictions, on local communities' behaviour. For example, activities such as charcoal production or any other type of modernization will not be allowed in the mangrove areas under the custodial permits. I argue that this reflects the fact that outsiders want to see traditional communities as they have been until now, which, in turn can have an effect on the type of programs and projects designed for them. An interesting example is the construction of the coconut warehouse and processing plant financed by PRODEPINE in one of the REMACAM communities. The national World Bank consultants (the "experts" -engineers from Quito, *mestizos*) wanted to use a thatched roof because it is ancestral, and native to the area; the community were opposed to this as it is not only very difficult to find thatching material (as is very scarce nowadays) but it also needs to be replaced very often. They wanted to use corrugated iron sheets.

> *"Why?* (said one of the leaders), *why should we use a traditional material that is bad, only to have you happy because the community looks the same as 100 years ago? Maybe we should get rid of the latrines as they are not ancestral and they were not here 100 years ago or the project itself as this one is the first coconut plant in the area"* (Tolita Pampa de Oro, meeting, July 2001).

The frustration expressed here by the community leader is understandable, donors have a specific view of how communities should look, and now with the new cultural and indigenous awareness, donors want to conserve the traditional "feel". Sometimes they do not understand that communities change and want new modern materials, as one of the leaders in that community told me

> *"we want to use cement and concrete, we used wood and thatch before because we did not have anything else. Now we know better, there are better materials and we want to use them"* (Hugo Cuero, community leader Tolita Pampa de Oro, interviewed July 2002).

The other aspect that can have serious implications is that this subjecfication can lead to the romantic idea that traditional communities know best, that mangrove dwellers have a

superior understanding of the mangrove environment, and that all their practices are good for the environment and the mangroves. As the Mangrove project director –Edgar Lemos warns:

> *"We need to be very careful as not all traditional or what is considered traditional practice is good for the mangrove resources. Take for example what is happening with the cockles, according to our research the cockles collected are smaller and smaller each time and when they are not sold, they are left to rot on top of the house instead of being taken back to the mangroves. This is not good news for the cockle fishery; we need to do something about it"* (Edgar Lemos, interview November, 2002).

From the surveys and the interviews with local communities I found several other fishing practices, such as the use of dynamite, the use of non-discriminatory fishing nets, and the introduction of post-larvae nets in some areas of the Reserve. These practices are considered damaging not only by the researchers or reserve officials, but also by the same fishermen themselves. These practices need to be addressed as they could cause the collapse of several of the fisheries, not only inside the REMACAM but also outside the area. Representing these practices as traditional, is limiting the possibilities of making more sustainable use of mangrove resources.

When it is assumed that all local communities, fishing and other practices, are environmentally sound, and that they live in harmony with the environment, we are disregarding the fact that local communities are in constant contact with outsiders and that some of the outsider perspectives have permeated into the communities. This is especially true in the bigger more urban communities that are exposed to market forces. For example, the REMACAM communities now have access to roads from San Lorenzo and there is more demand on the fishery resources (fish, cockles, crabs), and this is having an effect on the way these resources are gathered (see chapter 5, section 5.6). This in turn, is changing the relationship between communities and their natural resources. Coastal inhabitants have been part of the purchase economy for a long time, and they have access to new materials and techniques that can modify the way they use their environments. Communities are not static or isolated, they change, they evolve and their knowledge, practices and relation with the resources change and evolve also.

We need also to be aware of other changes, those produced by natural and external forces, over which the communities do not have control. These can have an incredible effect on the way communities deal with their resources, and how vulnerable they could become. For example, changes due to the El Niño phenomenon[108] affect fish and shellfish distribution, which can have a knock on effect on reproduction and distribution patterns of flora and fauna (including commercial fisheries). Other global phenomena such as climate change and sea level rise, will have a very important effect on the communities and their relationship with the environment.

At the other end of the spectrum, we have the changes induced by the shrimp farming industry. As was discussed in chapter 2, section 2.6.1, the effects of shrimp farming building could modify the whole coastal dynamics in Ecuador. These modifications can hasten the effects of El Niño, climate change and sea level rise, increasing the vulnerability of the communities, in chapter 5, section 5.2, a very good example is shown about the adverse effect of hydrodynamic changes in La Barca community due to the construction of shrimp farms in the nearby areas. The example shows how erosion rates increased so quickly and caused such damage that the community was forced to abandon their newly built houses. In this case the community was not able to perceive the changes in erosion rate because it was the result of wider hydrodynamic modifications and happened very quickly. This is only one example of how external changes can have detrimental effects on the way communities live, and how they respond to their natural environments.

My argument is that idealizations and subjecfications of local communities will not allow us to see that there are many external forces impinging on the use and management of natural resources. These external forces have very important effects on communities, so we cannot assume that all community practices are environmentally sound. Also it is very risky to expect that communities on their own will be able to deal with natural resources and environmental management under new changed circumstances. Communities with their knowledge and experience, should be the core of an integrated strategy for natural resource management that takes into consideration local resources, practices, experiences and communities and blend it with new management tools.

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[108] A sporadic and irregular event that changes not only weather patterns but also produces extra high tides and changes in currents, salinity and temperature.

6.3 Commons property regimes and natural resource management

After centuries of dissolution of the vast majority of commons property regimes (CPR) in the western world, and their replacement with forms of private property, it is interesting to see a resurgence of interest in common property regimes for natural resource management. Brown and Slee (2004) argue that the underpinning for the historical drive to dismantle common property regimes was the belief in the ultimate superiority of private property regimes for economic development and /or the avoidance of environmental degradation. The current interest in CPR is the result of research by scholars, such as Elinor Ostrom, who have drawn attention to numerous empirical cases where common property institutions have been successfully organised to aid sustainable local-level management of resources held in common (see for example: Ostrom 1990).

But what are the commons in relation to mangroves, how can we define them? The commons is used in everyday language to refer to a diversity of resources and facilities as well as to property institutions that involve some aspect of joint ownership or access, and also is subject to degradation as a result of overuse. Ostrom *et al* (2002), argue that these resources should be called common-pool resources, and that there is a diversity of property rights regimes to regulate their use. Among the regimes, we can find, for example, government ownership, private ownership and ownership by the communities. The next section will explore the definitions of some of the most significant property regimes, and their importance in the management of common-pool natural resources in Ecuador.

6.3.1 Common property or open-access?

Common property regimes are formed when individuals agree to limit their individual claims over a resource in the expectation that other group members will do the same (Richards 1997). Since individuals can either use the resource for joint personal and community benefit, or act in a way that may subtract benefits from other individual users, management of common property resources is specified by regulation of access to the resource (given by membership), and a set of rules which indicates how the use is distributed, what inputs are required by each member, and what are the mechanisms to enforce the rules. When no property rights define who can use a common-pool resource, or how its uses are regulated, a common-pool resource is under an open-access regime. Table

6.2 illustrates the different attributes of common property (CP) and open access (OA) regimes.

Table 6.2 Attributes of CP and OA regimes

	Common property	**Open access**
Access	Membership rule (right of exclusion)	Anyone (right of inclusion)
Use/restrictions	Distribution	None
Input requirement	Allocation rule	None
Enforcement	Agreed mechanism	None

Source: Richards (1997)

One of most important characteristics of common-pool resources is that they are subtractable, one person's harvest of fish or timber, subtracts from the amount left at any one time (and potentially over time) for others. Because of this characteristic, common-pool resources can be easily over-harvested, degraded and even destroye. This is especially the case in open-access regimes. Because of this characteristic, many policy makers and academics, concluded that, when resources belong to all, they are inevitably abused (Dolšak& Ostrom 2003). They considered that customary tenure systems with their communal forms of ownership and management were archaic and will lock people into a "tragedy of the commons" (see section below) scenario. The community was considered to be unable to stop individual users from over-exploiting the resource (see for example: Smith 1981). So, the rationale was that the only way to avert environmental disasters is for the State to take charge, and impose an external solution, namely privatization or nationalisation. This leads, to the wholesale appropriation of common land and forest and its transfer to the public domain: the central government (Hesse& Trench 2000).

The transferring of common-pool resources to public domain is, in my opinion, a lack of understanding of common property regimes. Common property regimes are governed by local institutions, with their own rules for allocation and restrictions, and with an agreed mechanism for enforcement; under normal circumstances these rules and mechanisms will be enough to make a rational use of the resource. In contrast, open access regimes' lack of mechanism and rules, is most likely to cause over exploitation and degradation. What is interesting is that, transferral of natural resources to central governments do *de facto* convert those resources into open access resources, as the government is unable to oversee its management, and enforce rules on their use and

allocation. For example, Richard (1997)reports that, there are no rangers in two million hectares of state forest in Northern Ecuador and in real terms, those public forests have become open-access resources. In section 6.4 we will examine how the Ecuadorian laws and legislations for mangrove management, converted this resource into an open access resource, vulnerable to abuse by stakeholders.

Continuing with the idea of cultural representations and conceptualizations, I argue that common property regimes can equate to the insider perspective, the resources are everybody's resources, whilst open access regime correspond to the outsider perspective: they are no-body's resources.

6.3.2 The paradigm of the tragedy of the commons

Perhaps one of the most influential and most often-cited scientific papers writen in the second half of the 20th century is "Tragedy of the Commons" by Garret Hardin (1968) which was published by Science [109]. The article stimulated immense intellectual interest across both natural and social sciences, extensive debate, and a new interdisciplinary field of study (Hardin 1998). The term "The Tragedy of the Commons" (TTC) is now a central concept in human ecology and the study of the environment. The argument is quite simple, common access to a natural resource usually leads to its degradation, since benefits from resource use accrue to individuals while costs are shared. The tragedy occurs when many independent agents derive benefits from the same resource which can be threatened by aggregate use. Each user is faced with a decision about how much of the resource to use; if all users restrain themselves, then the resource can be sustained, but there is a dilemma. If you limit your use of the resource and your neighbours do not, then the resource still collapses and you have lost the short term benefits of taking your share (Hardin 1968).

The tragedy seems inexorable however, as the logic depends on a set of assumptions about human motivations, about rules governing the use of the commons, and about the character of common resource (De Young 1999). In the introduction to the book "The drama of the commons" Ostrom *et al.* (2002) argue that things are not as simple as in the

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[109] The paper has been reprinted more than 80 times since it first appeared in Science in 1968 (Andelson 1991). According to Hardin himself the essay has been included in anthologies on ecology, environmentalism, health care, economics, population studies, law, political science, philosophy, ethics, geography and sociology (Hardin 1998).

prototypical model, human motivations are complex, rules governing the commons do not always permit free access to everyone, and resource systems themselves have dynamics that influence their response to human use. The result, they reasoned, is not often a tragedy, but what can be described as a "comedy", one with a happy ending (Ostrom *et al.* 2002, p.4).

Perhaps one of the most important aspects of the TTC is the debate it has stimulated and the increased interest in commons research. Diezt *et al* (2002) report how prior to Hardin's publication there were only 17 articles related to commons research, between 1996 and 2000, 573 new articles appeared on the commons. The TTC paradigm has been highly criticised by authors such as Warner, who argues that commons regimes have been much maligned and misrepresented since Hardin's predicaments (Warner 1997). Others argued that Hardin's commons refer to open access regimes not to common property regimes[110]. One of the most important aspects of the commons debate has been the growing empirical evidence that suggests that local communities are more likely than the state to manage natural resources in a responsible way, because their livelihoods depend on it (Hesse& Trench 2000). There is also growing recognition that they have been doing so for many years in spite of the presence of central government control. Research has also shown how common property systems actually work (see for example: Berkes 1989, Ostrom 1990, Ostrom *et al.* 2002, Dolšak& Ostrom 2003) and how they act to assure access to important natural resources by all members of the community, including the landless and other marginalised groups (Arnold 1998). They fulfil important social functions such as maintaining conflict resolution mechanisms and can also assure conservation of natural resources and biodiversity. The tragedy of environmental degradation and resource destruction, some argue, is likely to occur when customary common-property regimes break down, and are replaced by unregulated profit-driven forces that have no long-term vested interest in preserving the existing environmental equilibrium in the particular locality (Diegues 1999). I will also add that break-down of customary common-property regimes is often the result of changes in government legislation, the administrative act of putting common-pool resources management into the public domain, without proper enforcement mechanisms, invalidates customary

[110] There are several books on this debate: Berkers (1989, 1993, 1999); Dolšak and Ostrom (2003); Ostrom (1990); Ostrom *et al.* (2002).

management regimes leaving traditional communities and resources vulnerable and removing community incentives for a sustainable use of the resources.

6.3.3 Defining co-management

The new understandings of resource institutions (discussed above) re-discover common property regimes as viable mechanisms to promote sustainable resource management; this coupled with the current wave of decentralization, and local participation frameworks, are making easier the promotion of participatory management approaches such as co-management. According to Agrawal (2002) national governments in nearly all the developing countries in the last decade have turned to local-level common property institutions as a new policy thrust, to decentralize the governance of the environment and natural resources. In this context, co-management is currently becoming a key term in the debate on how to avoid environmental and natural resource degradation in common-pool resources, and is being promoted by multi-lateral, and bi-lateral, donor organizations and government agencies (see for example: World-Bank 1999a). Under this new co-management strategy, local communities will be allowed to play a key role in the management and use of their environment and natural resources.

Co-management is an evolving method of managing natural resources that involves the sharing of management responsibility, and/or authority of a resource, between the government as owners of the resource, and the local community as users of the resource (Ring *et al.* 1998). According to Carlsson and Berkes (2003), co-management arrangements blend together two "pure" management alternatives, state-level management and "local-level management". There is no one set form of co-management. Rather, co-management occurs across a broad spectrum of possibilities of power sharing, depending on country and site-specific conditions. Governments usually retain responsibility for overall policy and coordination functions, while local communities play a large role in day-to-day management (White *et al.* 1994).

Because there are so many conditions and resources under which co-management strategies can develop, there is no strict definition of co-management[111]. There are however

[111] The International Workshop on Community-Based Natural Resource Management proposed the following definition: "The sharing of responsibilities, rights and duties between primary stakeholders, in particular local communities and the Nation-State; a decentralized approach to decision making that involves the local users in the decision making process as equals with the Nation-State" (World-Bank 1999a:11).

some objectives and characteristics that allow us to recognise co-management strategies. Kellert *et al.* (2000, p.706) offer a very good set of characteristics to share by co-management regimes:

- A commitment to involve community members and local institutions in the management and conservation of natural resources.
- An interest in devolving power and authority from central and or state government, to more local and often indigenous institutions and people.
- A desire to link and reconcile objectives of socio economic development and environmental conservation and protection.
- A tendency to defend and legitimize local and/or indigenous resource and property rights.
- A belief in the desirability of including traditional values and ecological knowledge in modern resource management.

One of the most prominent objectives of co-management regimes is the emphasis on power participation, and property rights, of frequently marginalised people, so co-management is a mixture of political, organizational, socio economic, epistemological and institutional features. However, as Berkes and Henley (1997) pointed out, sharing of power and obligations implies a partnership of equals. In the past the relation between government agencies and local (and/or) traditional groups, has hardly been one of equal power and status. The authors believed that one of the major mechanisms for creating an equitable relationship lies in the recognition of local knowledge as a legitimate source of information and values. Further, I argue that, for co-management strategies to work, real institutional and legislative mechanisms need to be implemented, and power and economic benefits, should be equally distributed as also should decision making responsibilities. Special attention should be directed at reducing conflicts, and including the most vulnerable segments of the communities.

In general, the rationale for co-management is powerful, compelling and convincing, however, authors such as Kellert *et al.* (2000)warn that promise and rhetoric represent one reality, and the implementation and delivery on optimistic aspirations quite another. One of the most difficult aspects is the reconciliation of conflicting objectives such as socioeconomic development, environmental protection and sustainable resource utilization. Authors recognised that co-management approaches are complex and difficult to

implement (see for example: Vyrastekova& van Soest 2003); however, there is a consensus of opinion now that these approaches have the potential to turn non-viable, *de facto* open access to natural resources such as mangroves, into effective common property management (see for example: Glaser& Oliveira 2004).

A very important aspect, that will be analysed later in the case of mangrove resources in Ecuador, is the fact that two institutional reform strategies -decentralization and co-management - appear to have the same goals, whilst starting out differently and often employing different means. It is thus possible to understand them as two parallel processes that are mutually supportive of each other, and that should be able to meet 'in the middle'. Both strategies are based upon the premise of empowering local actors in the management of natural resources, starting from 'below' and 'above' respectively. The strategies share a concern with the appropriate scale of action, as well as with creating linkages between the local level and the levels above (including the international level). In co-management, the focus is not wholly on local communities, and in decentralization it is not solely on the local government. In the case of decentralization this will, of necessity, have to be paralleled by devising new integrative rationales and mechanisms, in order for the devolved administrative and management system to stay together. Taken together, the two reform strategies do this through parallel 'top-down' and 'bottom-up' approaches. In this sense, co-management partly supports and partly presupposes decentralization, and vice versa. Thus, both co-management and decentralization are inter-linked and depend on each other in order to succeed.

6.4 Property regimes in the Ecuadorian mangroves

Property rights regimes in mangrove areas are as complex as the mangrove ecosystems themselves. The juxtaposition of terrestrial and aquatic layers, the multiple-resource production, the joint production nature and seasonal access to its resources make them a very special case (Walters 1998). Mangroves are dominated by water, so its management will include aspects of marine and aquatic resources; also they produce timber which adds to the complexity of the property rights structures, and to the institutional arrangements which directly affects its use and management. This multi-resource characteristic, influences the structure of resource-tenure, and the demands, from a huge number of users. Mangroves are not only utilized by local dwellers, but are also the focus of intense development pressure, as swelling populations make their advance to the

coastal areas, and new neo-liberal industries look for cheap land to develop (Barbier& Sathirathai 2004).

The complexity of the ecosystem and the variety of uses, and users, has resulted in an intricate, and often ill defined property rights regime. According to several authors, the unclear definition of property rights and the legal standing of the ecosystem, are to blame for mangrove depletion around the world, and has accelerated the rate at which mangroves are converted into shrimp farms (Southgate 1992, Walters 1998, Adger 2000, Barbier& Cox 2004). This section will explore the legal standing of mangrove ecosystems in Ecuador. The institutional arrangements for its management will be presented, and the law and regulations that govern its use and conservation, will be analysed in order to try to understand what made the depletion of the ecosystem during the shrimp farming boom possible.

6.4.1 Institutional arrangements for mangrove management in Ecuador

There are several characteristics seen to be shared by mangroves around the world. Firstly, until recently their goods and services have been undervalued. Secondly, they are normally inhabited by traditional, marginalised groups that have used them for subsistence economies. Thirdly, in the last decades mangroves have been destroyed and their traditional communities together with their traditional economies are being displaced by modern intensive uses such as shrimp farming. Last but not least, in the majority of countries, mangroves are owned and controlled by the State; a fact that seems to have made possible their conversion from a common-pool resource, into a corporate property system. In Thailand for example, mangroves are owned and controlled by the state through the royal forestry department, but in practice they are open areas into which anyone can encroach. According to Barbier and Cox (2004) these open access conditions have allowed illegal occupation of mangrove areas for the establishment of shrimp farms.

The situation in Ecuador is not very different from Thailand. Under the Ecuadorian laws all coastal land lying below the highest tide line is national patrimony (IDEA 1989), this encompasses coastal beaches, large portions of salt flats and of course all mangrove forest and estuarine ecosystems. As a result of this legislation, the formal private ownership of inter-tidal mangrove areas is forbidden, and its use and management is in the hands of the government. To administrate and use the resource, the government has given

jurisdiction to several governmental agencies; table 6.3 shows the most important agencies and their jurisdiction over mangrove ecosystems.

Table 6.3 Government agencies and their jurisdiction on mangrove ecosystems in Ecuador

Agency	**Jurisdiction**	**Legislation**
Ministry of Environment (MoE)	Mangrove cutting and clearance, pollution	Forestry and natural conservation areas law, special mangrove decree
Subsecretary of Fisheries Resources (SRP)	Harvesting of bio-aquatic products, mangrove cutting and pollution	Fishing and development fishing law, Code for species culture
National Water Resources Institute	Use of water in fisheries (rivers, estuaries, sea)	Water law, institutional regime for water
National Forestry Institute (INEFAN)	Tree harvest and management	Forestry law
National Public Works Agency	Pollution of fresh and coastal waters	Public works code
General Directorate of the Merchant Maritime (DIGMER)	Building in beach and bays areas (8 m), mangrove cutting and clearance	Maritime police code
National Institute for Rural Development	Property of areas around mangroves	Rural development law
Judges	Mangrove cutting and pollution	Civil code
Regional Administrative Tribunal	Pollution of mangrove and water bodies	Regional code
Health Ministry	People death from pollution of mangrove and water bodies	Health code
Port Capitan	Mangrove cutting, clearance and pollution	Maritime police code
Municipal Commissary	Pollution of mangrove water bodies	Municipal law regime
Towns major (Mare)	Mangrove cutting and clearance	Municipal law regime

Source: authors own analysis

These are only some examples of the most direct agencies involved in mangrove management and conservation. According to research carried out by C-CONDEM's legislation branch (Roman 2002) there are more than 56 laws, decrees and forms of legislation to protect the mangrove ecosystems in Ecuador. All of them are disparate,

falling between ministries, and in some cases they are either obsolete or contradictory. Generally, there is little understanding of which agencies are responsible for enforcing which regulations, or whether local, state or national governments have ultimate authority over the issues involved. The most important aspect to understand here, is the sectoral government management of the mangrove ecosystem, rather than an integrated ecosystem management. This lack of recognition of mangroves multiple use reflects the outsider perspective we discussed in section 2.1. This framework is showing us how the outsider perspective of the ecosystem has permeated into the institutional arrangements, to manage the country's mangrove resources, with emphasis on single use rather that treating mangroves as a holistic ecosystem, provider of multiple resources. It also shows a total lack of understanding of the ecological and social realities of the ecosystem. The next section will detail some of the most important laws and regulations for mangrove management.

6.4.2 Mangrove laws and regulations[112]:

One of the most interesting aspects about mangrove management in Ecuador is the fact that the government only turned its attention to regulating the use of the ecosystem when the shrimp farming industry began its rapid expansion in the 1970's. Before, there were only some general norms and regulations that could be applied to mangroves, such as the Colonization and Vacant Land Law (1964). It was a reform of the Police Code in 1973 that provided the first specific legislation on mangroves. According to this reform the exploitation of mangrove areas is forbidden unless authorised by the General Forestry Development Directive (DINAF 1989).

In 1978, the National Forestry Directorate published Supreme Decree 2939 (R.O. 596 of October 23, 1978), which prohibited (for the first time) the use of mangrove forest for shrimp farm construction[113], and required zoning plans to be prepared for any site where mangrove cutting would take place. Such cutting was to be carefully planned and accompanied by reforestation. Agricultural interests promoted the ruling that shrimp farms

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[112] This section will present the most important laws and regulations for mangrove management, as explained in the above section there are at least 140 laws, decrees and legislations to manage mangroves resources in the country, it will be impossible to present all of them. Section 4.4 will present the regulations use by the mangrove defence movement, and chapter 5 will explore what will happen to law and regulation under the new decentralization framework.

[113] Article 6: The construction of pools for the culture and production of shrimps in areas cover by mangroves is forbidden (see Efficacitas, 1999:4)

could not be constructed in coastal land suitable for farming (Bodero& Robadue 1995). The following year, the Churute Mangrove Reserve was established through a Ministerial Agreement (Number 322, O.R. 69 of November 20, 1979). Two years later, the Forestry Law provided for controlling the cutting, transportation, and export of mangroves. The Navy was empowered to confiscate boats and cargo of illegally cut mangrove logs (Efficàcitas 1999).

In 1985, the CLIRSEN[114] published the first comparison of mangrove forest cover between 1969 and 1984. This comparison revealed the extensive damage caused by shrimp farming development on detailed maps. According to the maps, some 21,587 ha of mangrove have been lost. The government responded swiftly through Executive Decree 824 (O.R. 64 of June 24, 1985), which declared it was in the public interest to conserve, protect and restore all mangroves (Torres-Benavides& Yèpes-Reyes 1999). The Fisheries Law of the same year prohibited destroying or altering mangroves and forbade installation of shrimp ponds in mangrove areas. In 1986 the Ministerial Agreement 498 (O.R. 591 of December 24, 1986) declared all mangroves in the country as Protective Forest[115], and then the Fisheries Law in 1994, again ratified the protected status of all mangrove areas in the country (Roman 2002).

From the laws and regulations above, we can see, firstly that mangrove management in the country has been reactive and it is not until the damage to the ecosystem is revealed that the State takes some action. Secondly the government responds with very strict regulation focusing on conservation, centralized enforcement, and prohibition of all mangrove uses. The Executive Decree 824 not only protects mangroves, but makes traditional uses of mangroves, practiced in coastal communities, illegal. What is important is that, no provision is made to really enforce the new regulations. Under these new regulations, mangroves are taken from the traditional communities' management, and put into a public domain regime, without providing any mechanism to enforce rules and regulation. So, we can argue that a common property regime was *de facto* converted into

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[114] Centre for Remote Sensing of Natural Resources (belonging to the Military Geographic Institute)

[115] *Bosque protector*: this category is used for forest and special types of vegetation, and can be declared either in public or private lands. The objective is the conservation and protection, according to the Forestry Law inside the protected forest only recreational, tourist, and scientific activities, can be developed. Government reserves the right to execute public works that it considers priority in the area (Efficacitas, 1999).

an open access regime, the actions to protect the mangroves in reality made them more vulnerable to encroachment.

It is important to note here, the total disregard of local and traditional communities under this new regime. There are no provisions in the new regulations to accommodate the traditional communities that have long inhabited the mangrove ecosystem. Basically, the government sees the mangrove areas as an 'empty space', it also shows us how these traditional communities are almost invisible in the eyes of the government. What is interesting is that the damage to the ecosystem was being caused by the big shrimp farming enterprises, and not by the traditional dwellers. Furthermore it was the traditional dwellers who were suffering displacement due to the mangrove depletion. Here we can see a clear illustration of the outsiders' view in the legislation. The conservation regime imposed by the government is exactly the same type of conservation that developed countries will impose.

6.4.3 Shrimp farming[116] regulation

The rapid expansion of shrimp farms at the expenses of mangrove ecosystems obliged the government to establish a legal and institutional framework to regulate the development of the industry. The first government regulation was issued in 1975. Under this the construction and operation of shrimp ponds on public lands was allowed under a renewable 10-year concession. According to Parks and Bonifaz (1994), although the system of concessions was well intentioned, it very quickly became an open source of corruption and a critical policy issue, affecting natural resource management. They argued that the short length of the concessions contributed to the short mining of mangroves as a location for ponds and not as post-larvae producers. Longer concessions, that allowed producers to reap the potential of mangrove as a post-larvae producer, would have made more economic sense.

The most important aspect of these concessions was the fact that their price was far below their value, the annual fees charged to permit holders were less than $10US dollar per ha per year[117]. The concessions were granted by the Ministry of Industry and

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[116] The name given by the government is bio-aquatic species farming regulation, what is interesting is that the regulation only deals with the culture of shrimps, and includes installation of shrimp farms and hatcheries.
[117] In 1998 the governments *Contraloria General* value each ha of mangrove at $13061,84 US Dollars - (Torres-Benavides, Yépes-Reyes 199:123).

Commerce (MIC), and the Ministry of National Defence (MoD). However, it is interesting to note that neither the MIC nor the MoD have any jurisdiction on mangrove resources. In 1985 the regulation was amended, and specific articles prohibiting the conversion of mangroves to shrimp ponds were introduced; also farm owners were obliged to monitor, and protect mangroves and also agricultural lands adjacent to their farms (CNE 1985). Again the regulation did not provide a real mechanism for enforcing and monitoring the legislation.

Another aspect of the industry, the collection of wild post-larvae (PLS) was never regulated. Availability of PLS was essential to the development and expansion of the industry, and as shown in chapter 2, section 2.6.4, by 1984 the industry was already experiencing PLS shortages. According to Parks and Bonifaz (1994) the economic interaction between shrimp farmers demands for PLS, and the artisanal fishermen collecting them, was environmentally devastating and the unregulated interaction perpetuated the instability of the industry. There were no public agencies regulating the PLS fishery and, in fact, there was a government decree clearly stating that all beaches, estuaries and mangrove ecosystems of public access were open to PLS fishing (IDEA 1989). This is a very good illustration of the government's lack of understanding of the role of mangroves in the production of PLS, and the environmental damage inflicted by the un-regulated development of this fishery. A good regulation of the PLS fishery should have given the government an excellent tool to encourage the protection and conservation of mangroves, and should have made the industry more stable.

6.4.4 Using and abusing the legal framework

Mangrove legislation has been one of the most important tools used by the C-CONDEM to stop mangrove destruction. One of the most important pieces of legislation in their fight has been the Ministerial Agreement 498 (December, 1986 see: MAG 1986) and its modification (Ministerial Agreement 238, July 1987). The 498 agreement declares all mangroves in the country as protective forest, and agreement 238 determines the need to establish the real extent of mangrove cover in the country, with the objective of adopting the necessary measures to conserve, and protect mangroves, and to replace damaged ones. The agreement provided the specific mangrove area for the five hydrographical systems in the country (DINAF 1989); table 6.4 shows the mangrove cover (in hectares) recognised

by this agreement, the provincial system where they are located and the percentage of mangroves in each system.

Table 6.4 Mangrove cover in each hydrographical system officially recognised by ministerial agreement 238

System	Province	Hectares	Mangrove % in country
Santiago-Najurungo-Mataje	Esmeraldas	40,939	11.28
Muisne-Cojimies	Esmeraldas/Manabi	20,093	5.54
Chone	Manabi	2,788	0.77
Guayas	Guayas	203,590	56.12
Pagua, Jubones, Santa Rosa Arenillas	Oro	95,392	26.29
Total		**362,802**	100

Source: ha of mangroves from Ministerial agreement 498, % calculated by author.

Even though the mangrove cover provided in this agreement excludes the areas already occupied by the shrimp farming industry (by 1986), it has become one of the bases of the mangrove defence movement as it is the first and only piece of official legislation that gives the real extent of mangrove cover in the country. This agreement is used as the base-line to calculate mangrove loss in the country. Another important aspect of this agreement is that article 3 forbids all commercial activity in mangrove areas, mentioning specifically, the construction of new shrimp farms, or the extension of the existing ones (MAG 1987).

The other important aspect of the legislation used in the mangrove defence, is the 'conservationist' approach taken by the government. Even though as we explained before, this approach has not accommodated the traditional communities that live in the mangrove areas, the C-CONDEM has effectively used this approach. For example, the National System of Protected Areas (NSPA[118]) was successfully used in 1996 when they pressurise the government to grant status of ecological reserve to the Cayapas-Mataje estuary creating the REMACAM (see chapter 2). As analysed in section 2.3.2, the traditional communities were allowed to stay in the reserve, so the C-CONDEM somehow included the traditional

[118] NSPA will be explained and analysed under the new decentralization regime in chapter 7, section 7.2.2.2

communities as part of the ecosystem to be protected, thus modifying in a way, the government's strict conservation approach to mangrove management.

The NSPA was used once more in 2003, when the MoE, pressurised by C-CONDEM granted status of *refugio de vida silvestre*[119] (wildlife refuge) to the remaining mangroves in the Muisne area (FUNDECOL 2003b). The declaration also included the signature of an Administration, Use, Management and Custodial Agreement between FUNDECOL, the grassroots groups and the MoE. Under the terms of this agreement the traditional communities will be in charge of the administration, rehabilitation, protection and use of the area with the support from FUNDECOL, this is again a very interesting modification to the usual MoE conservation approach. The *sui-generis* characteristics of the REMACAM and the Muisne wildlife refuge are in my opinion a clear result of the new communitarian/environmental narrative we analysed in section 6.2.3.4.

When mangroves are declared protective forest, they are covered by the Forestry Law special regime. According to this regime, mangroves are not susceptible to private ownership or any other means of seizure, and will only be exploited through a concession administered by the Forestry Law and its regulation (CNE 1981). The INEFAN (which later became the MoE) was the sole agency responsible for the Forestry Law, so, as protective forest, the mangrove management could finally be managed as one ecosystem. Unfortunately the government never went beyond this declaration, and other laws such as the Fishing and Fisheries Development Law and the Maritime Police Code still have jurisdiction over the mangrove ecosystems.

Even though the government conservation approach has its failings C-CONDEM is convinced that legislation is one of the most important tools to stop mangrove destruction,

> *"The State has given us the legal instruments to defend the mangroves and to act against the shrimp farming industry, so we are using them. We will continue pressing the government to honour its own laws and regulations. We know the system is not perfect and we are trying to change it, but until now this is what we have and we will continue using it"* (Alfonso Roman, C-CONDEM Senior lawyer, interviewed July, 2002).

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[119] Wildlife refuge is one of the 7 categories of the NSPA, and is define as "...an area indispensable to guarantee the existence of resident or migratory wildlife. Scientific, educative and recreation uses are allowed" (FUNDECOL 2003c:6).

In 1994 the mangrove defence movement pressured the government to approve the Executive Decree 1907. Article 23 of the decree ratifies the Executive Decree 824, the Ministerial Agreements 498 and 238, and declared (again) of national interest the conservation, protection and restoration of mangroves. The most important aspect of this decree is its article 27 where the government declares a total ban[120] on mangrove exploitation for 5 years (CNE 1994). The following year (1995) the government approves the Executive Decree 2619, ratifying again its decision to protect all mangrove areas, and banning commercial mangrove logging, and the installation and expansion of shrimp farms in the mangrove areas. But the most significant feature is that article 9 of the decree, grants for the first time the *acción pública*, this is a very important legislative ruling, which recognises the right of any member of the public to denounce any law breaking in the mangrove areas (Torres-Benavides& Yèpes-Reyes 1999). This was a very important step for the mangrove defence movement, as from this moment on communities will not need a lawyer to be able to denounce law breaking in the mangrove areas.

On July 26, 1998 during the first Mangrove Defence Day (see chapter 2, section 2.7.2) and with the support of national and international NGOs, the mangrove defence movement issued a declaration demanding of the government a total prohibition, and a perpetual ban, on mangrove clearing and shrimp farming industry expansion in the mangrove ecosystem. This declaration (known as the Muisne declaration) was transmitted around the country and internationally, and indicated that for the first time the voice of the traditional dwellers had found public attention through national radio and television. The pressure resulted in the country's president approving the executive decree 1102, where a moratorium on mangrove exploitation, and clearance, and the total ban of construction of shrimp farms in mangrove areas was imposed. The decree also opened for the first time the possibility for local communities to receive mangrove areas in concession (Yèpez-Reyes 2004). This was an important milestone for the mangrove defence movement. Even though the construction of shrimp farms in mangrove areas has been forbidden since 1985, it was the first time the government had responded to the movement's pressure, and it was the first time the rest of the country heard the voice of the insider, the voice of the mangrove poor.

[120] All extractive activities were forbidden until 1999.

Another important element of the legislation that is being used, and that will become very important under the new decentralized regime (see chapter 7) is the declaration of mangroves as fragile ecosystems (CNE 1995). Under this regime all mangrove areas (independent of their conservation status) are the accountable to the central government and the MoE has full responsibility to administer them. Also important is the fact that the regulation book V of the EML, establishes a clear and practical mechanism to grant concessions to traditional communities by the MoE.

As the mangrove defence movement is using the legal framework to defend the mangroves, the shrimp farming industry has abused it to convert mangroves into shrimp farms. The first aspect exploited by the shrimp farmers was the lack of sanctions, and the weak implementation of laws and regulations. For example, the 1978 Supreme Decree 2939 forbids the construction of shrimp farms in the mangrove areas, but does not impose sanctions or fines on the transgressors or provide any mechanism for its enforcement. The reform of the Fisheries Law in 1985 imposed a 2 to 10 minimal wage fine[121] or 15 days in jail for mangrove cutting, but there is no mention of the size of area, so if they damaged 10 or 500 hectare of mangroves they will not get more that 15 days in jail. The sanction system is very complicated, firstly, there are four institutions that have jurisdiction (DIGMER, MoE, Fisheries Director and the judge). Secondly there are five different sets of legal regulations and laws that take into account the sanction: Forestry Law, the Penal Code, the Fisheries Law, the rules for the shrimp farming culture and the Maritime Police Code, all of which are in different government agencies. Thirdly, there are three different administrative acts (fine, prison, termination of concession), each one with a long list of steps (see annex VII), with sometimes impossible requisites, such as reports from technical offices, and strict times. For example, if the transgression is not denounced within 8 days of taking place, the demand is invalid. After the transgression is registered and accepted, the corresponding authority should process, sanction and then execute the legal action, here again there is no legal mechanism to enforce the corresponding authority to proceed. Table 6.5 shows an example of the transgressions denounced by the C-CONDEM in the Muisne municipality in the last 5 years.

[121] Between 200.000 to 1'000.000 sucres (US$ 30 to 150).

Table 6.5 Court proceedings for mangrove clearance in the Muisne municipality 1998 - 2003

Authority	No. transgressions	Processed	Sanctioned	Executed	Transgression not processed
M of Environment	99	52	47	47	47
M of Defence	79	1	1	-	78
M of International Business	42	-	-	-	42

Source: transgression records held by Ministry of Environment Esmeraldas forestry office and records from FUNDECOL

This example is not an isolated case in the country, in the Guayas area environmental groups such as *Fundación Natura* and *Acción ecológica* have faced the same problem. After transgressions are reported the majority stay on the officers desk and are not actioned (FUNDECOL 2000c, Acción-Ecológica 2001). The weaknesses of the system do not finish there; after the courts proceedings are executed, and fines imposed, there is no mechanism as yet to collect the fines (Minister of Environment, interviewed 2003).

Implementation of laws and regulations is hampered by the fact that ex-army and government officers became investing partners in some of the shrimp farming enterprises, so permits and concession were easily obtained, and other individuals just constructed their shrimp farms without permits. Once operations had begun they claimed that the area was above of the high tide line (and therefore not subject to public control). Permits and concessions obtained provided a very easy way to displace communities. These were shown to the local communities, and the communities believed that they were legal and thus abandoned the areas. On other occasions, helped by the authorities turning a blind eye, the construction of shrimp farms was very swift, and took the communities by surprise. Partnership with authorities and ex-army personnel also prove very important for the other strategy employed by the shrimp farming industry, that of violence. Private armed guards were (and are still) contracted to close and guard estuaries and creeks from local inhabitants. Death threats and evictions, have sometimes been carried out by the army and the police forces (Jermyn& Netzhammer 1999).

Other investors offer bribes. For example LiPuma and Meltzoff (1985, p.9) reported that bribes could reach a $100 per hectare. Illegality is one of the most important characteristics of the industry in the country, and is even acknowledged by the MoE

officers and the CNA. According to their reports at least 70% of the shrimp farms do not have ministerial agreements or any source of concession. In Esmeraldas province the illegality is even higher (95%) and a recent survey in the REMACAM found that 90% of the shrimp farms in the area are illegal (see chapter 4).

One more loop-hole exploited by the shrimp farming industry, is the fact that mangroves have not been legally defined by any of the laws and regulations that are trying to protect them. As explained before (chapter 4, section 4.5.3) there are seven species of mangroves in Ecuador. Each specie occupies a band according to the type of substrate and because there is no legal definition of what constitutes a mangrove, some of the mangrove areas are invaded, with the excuse they are not mangroves for example *natales, manglillos* and *ranconchales*[122]. The invaders cut fresh water input into the mangroves, and this results in the death of the trees. After the trees are dead the area is then reclaimed and the shrimp farms extended. This is one of the reasons why the mangrove defence movement has asked the government for a legal definition of what constitutes a mangrove, so as to close this loop-hole in the legal system. The communitarian mangrove law presented by the C-CONDEM which has not been passed yet (see chapter 7, section 7.3.4) provides the first legal definition of the mangrove ecosystem.

The other important aspect is the fact that shrimp farmers and their investors, have tried to use their position and power to change laws and regulations that protect the mangrove areas. In 1999 for example, the Law for the Rationalization of Public Finances[123] included article 164, the objective of the article was to allow shrimp ponds built on destroyed mangroves in public lands, over the previous five years, to become legal private property, or at least, that payment of US$1000 per hectare would convert the 60.000 ha of illegal ponds built after 1994, into legal 99 years leases (Martinez-Alier 2001). The executive director of National Aquaculture Chamber (CNA) Jorge Illingworth told the C-CONDEM that the article 164 was proposed by them and approved in a meeting with the government representatives, among them the Minister of Environment (FUNDECOL 2000c). Fortunately a massive mobilization and protest organized by the C-CONDEM, and supported by several international NGOs, obstructed the Law's approval,

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[122] *Natales* refer to the area colonised by the sp. *Nato megistosperma*. *Manglillo* is the name given to dwarf mangroves, and *Ranconchal* refers to the fern *Acrostichum aereum* a mangrove associated, that grows in disturbed areas (see chapter 4, section 5.3).
[123] Known as the *Ley Trolle 2*

and after a fierce battle (that included a public audience of the country's president and 4 ministers), the most senior judge of the Ecuadorian Constitutional Court declared unconstitutional, article 164, hence the article was dropped from the Law,

> *"This has been one of the most historic ruling of its class in Ecuador. Imagine the poor fishermen and cockle gatherers of the country taking the President and the ministers to court and winning, it was incredible, I still grin when I remember it"* (Marcelo 'Chili' Cotera, FUNDECOL president, and C-CONDEM member, interviewed July, 2002).

C-CONDEM has won several battles, but the struggle continues:

> *"We cannot rest, if we get distracted they change the legislation. Do not forget that the majority of MPs are shrimp farmers themselves. Don't you remember last month when we found out that several of the mangrove decrees were abolished by Noboa (the president) and we went to the ministry to ask about it and to protest. Well is like that all the time, as I told you we cannot rest"* (Alfonso Roman, C-CONDEM senior lawyer, interviewed July 2002).

Up until now this has been the legislative framework for mangrove management in the country. Chapter 7 will analyse how this framework will be modified or changed under the decentralization process. Also that chapter will examine in detail the new communitarian Mangrove Law presented by the C-CONDEM to the Ecuadorian Congress.

Chapter 7 - Neo-liberal reforms opportunity or threat for mangrove conservation in Ecuador?

7.1 Introduction

During the last decade the development recipe for Latin America has shifted significantly from centralized, bureaucratic inefficient States towards a more open, efficient state with a new state-civil society relationship. States are adopting more neo-populist approaches that claim to encourage greater local participation in development planning. Decentralization and civil society participation are at the core of the implementation of second generation neo-liberal reforms. Some have argued that the political shift towards a more inclusive, open and decentralised government is a political reaction to the limitations and failings of centralised models of administration and economic management. However this shift can be more easily described as being foisted on Latin America countries by Washington, and the development machinery under the banner for good governance (see for example: Ayres 1999, UNDP 2002, BID 2003).

Changes can also be seen as being prompted by political instability and social unrest caused by increased poverty and inequality. Structural adjustment policies resulted in social dislocations which achieved very modest growth rates during the 1990s[124] by failing dramatically to address poverty and inequality (Larrea& North 1997). In response to these damaging impacts on an already precarious social and economic base, nationwide mobilisations of indigenous together with non-indigenous peasants started taking place. This resulted in several countries ousting their political leaders. During the last decade five[125] South American presidents have been ousted from office, after popular protest. This year, after massive popular protest Ecuador has seen the ousting of its third president since 1997 (BBC 2005). Participation is now being promoted, not only as a means to achieve greater efficiency in resource allocation and service provision, but also as a means of

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[124] For Example Ecuador "in 1997 per capita GDP hovered around its 1981 level. With regard to social conditions, indigent households made up a third of the urban population in late 1993 and the overall national poverty figure stood at 56% in 1995 -42% and 76% in urban and rural areas respectively. Worsening poverty resulted from increased unemployment and underemployment and from the decreased incomes of those who managed to hold on to jobs: in 1992 the total wage bill came to only 56.6% of its 1982 level; manufacturing sector labour was most severely affected, with a 60% salary loss" (Larrea& North 1997:1).

[125] This number will be likely to be higher as Bolivia is going to a crisis (june/2005)

diffusing, if not resolving, social conflict resulting from social exclusion and inequality (Ticehurst 1998).

Another important element for this participatory shift, especially in Ecuador, has been the emergence of a very strong ethnic and social movement (largely only associated with *Nacionalidades Indigenas*[126]). This challenged State political organisation and spatial orders (Radcliffe *et al.* 2002), which in turn increased the pressure on the State for the creation of decentralisation policies and the development of a more participative approach to managing natural resources. Indigenous territories and districts have now become autonomous under decentralisation programmes with their own political, social and economic organisations and in some cases collective rights over their land and natural resources.

In this context, schemes for participatory management (co-management) are emerging as the key tools in the implementation of decentralization and civil participation strategies. Multi-lateral and bi-lateral donor organisations and government agencies have been particularly interested in promoting the use of co-management as an effective strategy for enabling the sustainable use of natural resources. This has been extensively promoted as an approach for pursuing biological conservation and socioeconomic objectives (Warner 1997, Kellert *et al.* 2000, Castilla& Defeo 2001, Mahon *et al.* 2003)

To be able to adapt to the new changes, the Ecuadorian State has been profoundly transformed in the past decade, creating the legal framework to enable local participation and decentralization (see section 7.2). The objective of the decentralization Law is to permanently transfer to local agencies such as the provincial council and the municipalities State functions, competences and attributions (CNE 1997). The law also provides a space for these functions to be transferred to new indigenous and afro-Ecuadorian institutions in their autonomous territories (when they get created).

Under this new legal framework and the "roll-back" of the central state, local government agencies grew in numbers and political significance. Municipalities were given considerable freedom to work in new areas such as rural development and natural resource management. At the same time indigenous and grassroots organizations

[126] Indigenous nationalities: 'First Nation' peoples

increased, not only their role in decision-making institutions, (such as CODAE and CODENMPE) but also in authority and public opinion, providing the perfect background for indigenous, local and grass-roots organizations to propose new territorial and natural resource management strategies.

In the coastal areas the mangrove defence groups, in alliance with afro-Ecuadorian organizations, NGOs and government agencies, are currently developing new strategies for mangrove management to ensure that the loss of mangroves and the livelihoods associated with them are halted in the remaining mangrove areas, especially in the north of Ecuador. Among the new strategies, the Process of Black Communities (PCN) is proposing a new black territory where afro-Ecuadorian communities will be able to participate in the use and administration of their natural resources. With support from the *Fondo Ecuatoriano Populorum Progressio* (FEPP) and the Ecuadorian government, C-CONDEM, has also started a stewardship programme in the REMACAM, where traditional mangrove areas have been given in custody to afro-Ecuadorian communities for their use, management and rehabilitation.

This chapter will examine the decentralization and social participation shift in the Ecuadorian government. It will introduce the new legal framework and examine how environmental management is being decentralised and address what is happening to mangrove management under the new decentralization policies. Section 7.3, analyses how local communities in the REMACAM area are engaging with decentralization and social participation reforms. Section 7.3.1 introduces the afro-Ecuadorian proposal for a black territory presenting an analysis of how this territory will function and the inside and outside tensions created by the proposal. The PCN ideas to reconstruct identity through the articulation of knowledge and their proposal for an ethno-education system in the black communities and the C-CONDEM's ideas for a non-formal education program in the mangrove communities is discussed in section 7.3.2. The custodial process initiated by C-CONDEM will be explored in section 7.3.3. Also their proposal for a new communitarian mangrove Law will be analysed in section 7.3.4. Through the examination of local communities engaging with neo-liberal reforms this chapter shows how local subaltern voices are reframing the environmental discourse, contesting and creating new laws and at the same time proposing new hybrid spaces of conservation (such as the REMACAM)

where the mangrove ecosystem and the communities that depend on them have a better chance to survive.

7.2 Decentralization and natural resource management in Ecuador

7.2.1 The new legal framework for decentralization and social participation

The origins of the decentralization process in Ecuador can be traced to reforms imposed by the Washington consensus during the 1980s, due to the region's external debt crisis. Decentralization[127] has been presented as the state response to the failed top-down approaches of centralised governments. This has been also hailed as the best remedy for democratic reform with the idea that decentralization leads automatically to improved governance and a reduction in corruption.

In theory, a decentralized state improves the relationship between citizens and their government, enhancing the public accountability of bureaucrats, elected representatives and political institutions, thus ensuring greater responsiveness in government (Ferguson& Chandrasekharan 2004). Decentralized states encourage new mechanisms for consultation and participation which fosters a better democratic system and a system of good governance. Taking decisions to local agencies is seen as a better system for affectivity and control with monitoring by local communities. Decentralization can promote monitoring, evaluation and planning at the local level and enhance community participation in decision-making.

The Ecuadorian government has presented decentralization as the best strategy for a more efficient government. They argue that a centralised state excessively burdened by functions and the public service administration, will inevitably be inefficient; decentralization will allow the central state to focus on the grandiose national tasks and the design of better policies to improve the country (CONCOPE 2003a). Additionally, the imbalances between rural and urban areas can be improved through decentralized strategies (CND 2001b). Under the decentralized banner government seeks to improve services such as health and decrease their administration costs to the state, thereby creating new relationships between different territorial sectors, giving, as a result, regional

[127] The transfer of authority and responsibility for public functions from the central government to subordinate or quasi-independent government organizations and/or the private sector (World-Bank 1999b).

integration with more equal distribution of the resources (CONCOPE 2003b). In reality, by reducing state inefficiency and bureaucracy with rising participation, the country is fulfilling international donor demands for good governance making decentralization the key administrative platform for neo-liberal reforms (Radcliffe *et al.* 2002).

To be able to respond to the challenges of decentralization and social participation the Ecuadorian government has experienced a series of transformations in the last decade. The foundation blocks for the decentralization legal framework are the articles 1, 3, 5 and 34 of the State Modernization Law[128], approved in 1993 (Law 50, O.R. 349 see: CNE 1993). This law established the principles and general norms for the regulation of decentralization, de-concentration and simplification of the Ecuadorian State (article 1, literal b). Then, the Special Decentralization and Social Participation Law (O.R. 169, 1997) provided the first specific legislative body for decentralization whilst article 3rd established that institutional functions will be transferred to sectional governments (CNE 1997). In 1998 decentralization acquired constitutional status when the National Constitution declared decentralization and local participation to be integral to the state's character (Art. 1, National Constitution) and determined that all competences of the central government can be subject to decentralization[129](ANC 1998).

The new constitution also declared Ecuador to be a pluri-cultural and multiethnic state, recognizing and warranting collective rights for indigenous nationalities and afro-Ecuadorian groups. Among the collective rights, the State recognises ancestral possession of communal lands for indigenous nationalities and afro-Ecuadorian groups and gives them the right to be part of the use, administration and conservation of the natural resources found in their territories (Art. 84, National Constitution).

In compliance with the constitution, dispositions, rules and procedures for decentralization were approved in 2001 with the National State Decentralization Plan (Executive Decree 1616, O.R. No. 365, 10 July 2001) and the Decentralization Law General Statutes (O.R. No. 349s). This completed not only the decentralization framework,

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[128] Modernization includes privatization and changes in public services provision, the law was an initiative of the Private enterprises.

[129] Descentralización: "es la transferencia definitiva de competencias, funciones, atribuciones, responsabilidades y recursos, especialmente financieros, materiales y tecnológicos, de origen nacional o extranjeros, de que son titulares el Gobierno Nacional y las entidades de la Función Ejecutiva hacia los Gobiernos Seccionares Autónomos" (inciso 2 Art. 225 de la Constitución Política de la República, en concordancia con el Art. 3 de la Ley Especial de Descentralización del Estado).

but provided the legal and administrative instruments to carry out the decentralization process.

The goal of decentralization, according to the Ecuadorian State, is to re-organise the administrative system and make a new political, economical and administrative decentralized state. This new system will be based on environmental, sustainable and governance considerations. In order to make this possible the new decentralized government plan to transfer all competences, functions, attributions, responsibilities and resources (financial, material and technologic) of national or international origin, which until now, have been managed by the State and its executive institutions, to autonomous sectional governments and local agencies such as the provincial councils and municipalities. However the State will be unique and non-dividable and will still be based on the traditional administrative and political divisions (CORDES 2002). Table 7.1 shows the current political-administrative division and the new sectional autonomous governments.

Table 7.1 Current politic-administrative units (in descending size) and their new sectional autonomic governments.

Unit	**Main authority**	**Sectional Autonomous governments**	**Sectional environmental authority (recommended by law[130])**
Province[131]	Prefect	Provincial Councils	Environmental management unit
Canton	Mayor	Municipality	Environmental management unit
Rural parish (*Parroquia*)	Junta president	Rural parish councils (Junta parroquial)	None
Territorial circumscription	President of *Cabildo*	*Cabildo*	Not yet established

Source: adapted by author from government publications.

[130] The CNE recommends the creation of environmental management units, but provinces and municipalities decide what type of unit they create, therefore we can find a very confusing diversity, i.e: Department of hygiene and health, Direction of environmental control, Department of environmental cleaning, Section of hygiene and environmental cleaning, direction of municipal hygiene, Municipal unit of environmental management, Unit of environmental unit and health, Municipal direction of environmental management, Department of environmental cleaning and drinking water, department of environmental hygiene, municipal ecological tourist police.

[131] Province *(provincia)* is the equivalent to County in England. There are 22 of provinces in Ecuador, 4 of them in the mainland coastal area (El Oro, Guayas, Manabi, and Esmeraldas)

It is important to note that territorial circumscriptions refer to the autonomous indigenous and afro-Ecuadorian territories. The circumscriptions establish autonomy, self-governance, and legal authority within a defined geographical space under the jurisdiction of one ethnic group, for example, Afro-Ecuadorians, or, in the case of Indians, a recognized indigenous nationality (Walsh 2002). According to the constitution they are political-administrative entities of autonomous regional regimes; under which the inhabitants have the right to establish their own political, social and economic organisations[132] (Lozano-Castro 2004).

The important issue here is whether the law provides the possibility for indigenous and/or afro territories to be established by the ethnic groups?. According to article 16 of the Environmental Management Law (CNE 1999b) there will not be any alteration in the current political-administrative division of the country, which means, that the current cantons and municipal borders will not be re-drawn. The government will implement a territorial restructuring plan (*plan de ordenamiento territorial*) which will be compulsory in the national territory. The plan will be drawn up by the government and even though article 13 of the same law contemplates the participation of the indigenous and afro populations this participation is limited only to a consultation of their representatives; any territorial demarcation will be carried out by the government. The central government will produce the national policies giving the provincial government, following the national policies, the faculty to establish the demarcation borders for cantons whilst the municipalities will control the demarcation of parishes (CND 2001b).

We can argue that article 16 of the Environmental Management Law is in contradiction with new indigenous and afro territorial circumscriptions, some of them being in different municipalities and cantons (see for example the CANE, section 7.3.1). So, even though the government is apparently giving the green light to indigenous and afro autonomous territories in the National Constitution, the statutes and rules of implementation do not leave much room for manoeuvre when setting them up with participation only at a "consultation" level. Real participation should include institutional mechanisms that allow indigenous and afro communities to participate in the decision-

[132] Territorial circumscriptions are similar to *resguardos indigenas* in Colombia, or the notion of reservation in the United States. However Walsh (2002) argues that in contrast to Colombia and United States these circumscriptions in Ecuador present a major challenge to the territoriality of the State because they could conceivably occupy the majority of the 'national' territory.

making process, and with setting up and implementation of territorial re-structuring plans that will have an effect on the communities' daily lives. As Sarah Radcliffe *et al.* (2002:301) notes "despite extensive legislation on participation and multiculturalism, there remains a mismatch between laws on decentralization and rights".

Another important change is that land titling (*titulación de tierras*) is transferred from the INDA (National Institute of Agrarian Development) into the hands of municipalities; land expropriation will be done by the provincial councils. The provincial councils will coordinate the municipalities so the ability to give land titling will be standardised, but the final decisions in the allocation process ultimately falls in the hands of the municipalities (CND 2001b:11). Again, territorial circumscriptions will have problems here: when they belong to different municipalities, they need to negotiate land titling with each municipality instead of having a standardised mechanism that will be applied in the whole of the territorial circumscription.

7.2.1.1 Transferring competences

The Special Decentralization and Social Participation Law established that institutional actions (competences, functions, attributions and responsibilities) are to be transferred to provinces and municipalities through the Agreement for the promotion of transfer competences (*Convenio de Promocion de Transferencia de Compatencias*). Using this agreement the provincial government agrees on which institutional actions will be assumed. This agreement is the framework for establishing the criteria and procedures of transfer between ministries and sectional governments. After general criteria and procedures are established, individual agreements will be signed between specific ministries and sectional governments. The provincial and municipal governments will be able to pick and choose which competences to assume[133]. I argue that following this scheme, the end result will be that provinces and municipalities will have different competences according to what they have chosen. Although the government wants standardized institutional actions to be transferred, there is no binding mechanism for provinces and municipalities to assume specific competences, so the end result will be a very complex institutional and management map without a geographical logic or thematic

[133] According to article 226 of the National Constitution all competences of the central government can be transfer, with exception of national security and defence, foreign policy and international relations and the economic and tax policies. Decentralization will be compulsory when the sectional government request it and have the operative capacity to assume it(ANC 1998:70).

definitions of competences (see, for example, mangrove competences section 7.2.3.1). The other question is, what happens with the competences that were not chosen by the municipalities or provinces, who will execute them?

As mentioned above the institutional actions that will be transferred are divided into competences, functions and attributions. The Ecuadorian government has used these actions as synonymous, but according to some lawyers (Real-Lopez 2004) they have different legal meanings that are very important to understand. Table 7.2 show the difference in meanings and their transferable status.

Table 7.2 Institutional actions and their status transfer

Institutional action	**Legal meaning**	**Transfer status**
Functions	Normal administrative functions, what an institution should do	Not transferable
Attributions	Institutional capacity to act	Not transferable
Competences	Administration actions which are exclusive to the institution. They are the legal actions the institution have	Transferable

Source: author's adaptation from Real-Lopez 2004.

The administrative competences are the only ones that can be transferred as they are the only actions that give mandates to public entities, functions are the characteristics of an institution so they can't be transferred. Due to the government's synonymous use of the functions, the transfer process confused functions with competences. Real-Lopez (2004) argues that this confusion has important legal consequences because not all the institutional functions established as transferable in the decentralization agreements can be transferred, as a result not all institutional actions contemplated in the transfer agreements are competences, some of them are functions. In other words, the state is transferring generic administrative actions, without exclusivity or obligation; this not only leads to a lack of a normative framework for some of the transferred competences, but also leaves the sectional government with the impossibility and/or not having the obligation to carry out these competences. This is especially worrying with regard to the functions transferred by the Ministry of Environment (MoE). A more detailed analysis of this process will be undertaken in the next section.

7.2.2 Decentralizing environmental management

The decentralization process of the environmental management commenced when the Modernization Law was approved in 1993; the environmental decentralization process can be divided into stages: 1. legislative background (1993-2000) and 2. proper decentralization process (2000-2004).

During the first stage the legislative framework was created and approved, when certain environmental regulations were introduced into the general legal bodies. In 1994, the Environmental Advisor Commission[134] started the environmental coordinating units in charge of the execution, together with the evaluation of the regional environmental activities in the provinces (CAAM 1994). This exercise provided no real practical results but allowed sectional institutions to practice some administrative scenarios of an environmental nature in their offices. In 1996, the MoE was created as the uppermost environmental authority in the country, with the responsibility to dictate and implement environmental policies, strategies and rules.

The first legal elements to integrate municipalities and open up participatory spaces for the co-management of natural resources can be found in the Special Decentralization and Social Participation Law (1997). Its 9th article established that "municipalities should co-help in the preservation and conservation of the state patrimonial cultural and natural goods in coordination with the responsible institutions" (CNE 1997:3). Also, as mentioned above, in 1998 article 84 of the National Constitution recognized collective rights for indigenous and afro Ecuadorian groups, among these rights are the administration and management of natural resources found in their territories.

The backbone of the environmental decentralization process was provided by the approval of the Environmental Management Law (EML) in 1999 (CNE 1999b). One of the most relevant aspects of the Law is the definition of the Decentralized Environmental Management National System (DEMNS), in which all environmental competences of other ministries are integrated. Article 10 states, that all state institutions with environmental competences will comprise the DEMNS and are obliged to follow the guidelines established by the National Council of Sustainable Development (NCSD). The important aspect here is that DEMNS constitutes the co-ordination, integration and cooperation

[134] Environmental Advisor Commission EAC (CAAM in Spanish) was the precursor of the Ministry of Environment and disappeared after its fusion with it.

mechanism between the different environmental and natural resource management agencies and institutions. This represents the first time that the government has tried to establish a dialogue between agencies and institutions. Until now, each institution has had their own laws and agendas to manage natural resources, as detailed below, if enforced DEMNS will provide a very important space for public participation.

To direct DEMNS the National Co-ordination Commission (NCC) was created. The commission comprises 9 members, one of whom is an afro-Ecuadorian. Among the other members there is a representative from CODENPE[135] and one from the Ecuadorian Committee for the Environment Defence (CEDENMA). The other 6 members are representatives of different government institutions and agencies including a representative from the higher education council (CONESUP) and one from the army. This is the first time afro-Ecuadorians have had a representative in such a high environmental body. However, it is important to note that the majority of members are government representatives and the commission president is the environment minister. Therefore, although they have a voice, they are in a minority and articulating their voice relies upon them making alliances with other organizations representing civil society (CODENPE for example) which in some respects, are part of the state, thus creating what Laurie *et al.* (2005) call uncomfortable allies and, at the end of the day, lessening their power again.

The importance of DEMNS and the NCC is that they are the only instruments that co-ordinate the transfer of environmental competences between different government agencies that are not part of MoE. They also have the possibility of establishing a coherent framework for the sectional governments to interact with other government institutions related to the environment (public works, mining, etc). DEMNS offers a coordination and harmonization space of complex environmental and legal institutional systems that do not belong to the MoE, providing the possibility of, not only a horizontal form of decentralization, but also a vertical one. Additionally, the NCC offers one of the only mechanisms (established by the EML) for public participation in the environmental decentralization process.

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[135] National Development Council of Nationalities and Peoples of Ecuador: a hybrid institution that receives founding from the government.

The EML offers another coordination mechanism called *sistema unico de manejo ambiental* (environmental management unique system). This system provides the normative elements that should have been distributed to the municipalities and provinces to achieve an homogenous regulatory system in the country.

During the second stage (2000-2004), the most important task for the MoE was to execute the decentralization process as dictated by the EML; in this context, the ministry approved some regulations and started developing the political and administrative instruments to decentralize its competences. Between 2001 and 2002 the provincial and municipality laws were reformed to be able to accommodate the EML mandates. The most important reform made to the municipality law was that depending on their financial possibilities, they will establish environmental management units, which can be either temporary or permanent. In the case of the municipalities that lack the financial resources, the association of municipalities will have a technical support team to help them in their environmental management (CNE 1999b, p.8).

In the case of provinces, the law is reformed to read: "the provincial councils will plan the use of their natural resources following the principles of conservation, development and sustainable use". Additionally, in article 50 the following is added: "the provincial councils, according to their financial possibilities, will establish environmental management units, which can be either act in temporary or permanent manner". The idea of both reforms is that provinces and municipalities should create environmental units. The problem is, that the reform gives provinces and municipalities the option of not creating them if they do not have the financial means. This clause has obviously created a two tier system with the better off (or willing) provinces and municipalities having environmental units and the less better off, or those not interested, not having one. In the case of coastal provinces, for example, a poor province such as Esmeraldas is not obligated to create an environmental unit. Worryingly this province is the richest of the coastal provinces in natural resources, and as we have already discussed the best remaining mangroves of Ecuador are there.

A quick look at the state of environmental decentralization in the CONAM webpage gives us a very good illustration of how a two tier system is being created. By 2005, Esmeraldas province had not signed a single environmental agreement with the MoE,

compared with the neighbouring coastal province of Manabi which has signed 21 (CONAM 2005a). The questions here are what will happen to Esmeralda's natural resources and who is going to manage them under the new decentralization regime?

7.2.2.1 Environmental competence transfer agreement

The most important instrument used by the MoE to devolve competences is the competence transfer agreement. The ministry created a model agreement called the CMD (*Convenio Marco de Descentralizacion*) where all competences, subject to being transferred, were included (CND 2001a). There are two types of competences to devolve: type a) management of woodlands, forestry plantations, wildlife flora and fauna (natural capital), and type b) environmental quality (see annex VIII) for the detailed list of competences and the basic functions needed for their operation). By 2004 there were 67 agreements signed between provincial councils and/or municipalities and the MoE (Real-Lopez 2004). What is interesting is that a revision of the CONAM sector map of environmental agreements published on their webpage (CONAM 2005b), shows only 47 agreements as active (6 provinces and 41 municipalities). A possible explanation for this difference is that agreements need signatures of ministry from MoE, local government representatives and the president, which need to be completed within 45 days of an agreement subscription. Changes of ministry or priorities in the ministerial office could have slowed down the process. This situation could also be an illustration of what some authors call the reluctance of municipal and provincial governments to accept environmental responsibilities (Torres-Davila 2004, p.59). Some prefects[136] on the other hand have accused the central government officials of blocking the decentralization process (see: Donoso 2001, Marun 2003).

The most important aspect of this transferral is that (as mentioned in 2.1.1) competences and functions were confused, as in the case of competence one, type A, which focus on formulating policies for the management of woodlands, forestry plantations, wildlife flora and fauna (see annex VIII, page 1). According to the EML a function of the MoE is to formulate policies and, as a function, it should not be transferred to sectional governments as it will be a very high risk that each municipality and province would create their own policies, thereby creating national mayhem as each regional body make and implement their own specific rules and policies. It is important to remember that

[136] Province main authority

the MoE was created as the highest environmental authority in the country with the responsibility to dictate and implement environmental policies, strategies and rules; the new transfer of competences makes this look somewhat eroded.

As mentioned before, municipalities and provinces are allowed to pick and choose which competences they will receive; this way of selecting competences creates management islands and voids in provinces in which some of municipalities have opted not to receive certain competences. The question here is, in this case who will be in charge? One of the obvious possibilities will be the provincial councils, but it will be very onerous and impractical for them to establish an institutional structure only for the municipalities that decide not to receive some of the competences. The other possible candidate will be the regional office of the MoE, but for political and financial reasons once the transfer of competences is done the regional MoE office will be dismantled in the internal structure, so the question remains, who will fill the void?

Another interesting element is that exactly the same agreement was signed with all regional governments, independently, whether or not they were provinces or municipalities. Nevertheless there is not a clear definition in the CMD of which competences correspond to municipalities and which ones to the provinces. Basically, clause 3.2 of the agreement allows any sectional government to receive any competence (CND 2001a), allowing the same competences be transferred either to provinces and/or municipalities if they asked for them. This situation could create conflicts between the two autonomous entities, which is especially worrying in the case of natural protected areas (see section 7.2.2.2).

Using exactly the same agreement for provinces and municipalities shows the lack of understanding about the practical and legal separation of the competences of the MoE, which are divided along subject and territory lines. Some competences are named with regard to natural capital and the other ones refer to environmental quality. Normally environmental quality competences are applied to urban areas and natural capital ones to rural areas. In the case of sectional governments however we can argue that municipalities will be more prone to receive natural capital competences, with the provinces receiving mainly environmental quality ones. The lack of flexibility in the transfer agreements and

its generalisation do not provide possibilities of deciding which are the best suited autonomic governments to receive each type of competences.

Conversely, the use of the same agreement is an indication that the MoE does not have a clear idea of the capabilities of each regional body. There is no indication anywhere that a diagnosis to evaluate the administrative and technical capabilities of the regional governments was made. The only requisite in the agreement was to "demonstrate institutional capacity" with a certification done by the same regional body that was asking for the competences. A diagnosis should have given a clear idea of the real capacity of provinces and municipalities to implement environmental competences, and should have identified possible sources of conflict, weakness and strengths of the regional bodies. As a result, a more discriminatory transfer should have been possible with the needs of provinces and municipalities being clearly identified. Nevertheless in the current structure this is unlikely to occur.

While the issues discussed above are crucial, the most poignant element of the transfer system has been the almost complete lack of social participation. There is no element in the transfer agreement that allows the autonomy governments (or authorities) to coordinate, consult or interact with communitarian, indigenous or afro organizations, or any type of civil organization. The process was basically developed in the administration sphere of the National Commission for Decentralization and Territorial Reordering (CONAM). This commission was created by and depends upon the president's office, and during the transfer process the MoE essentially surrendered its leadership to them (Real-Lopez& Bedoya 2004).

> *"This is dangerous, we do not what is happening with this process (competence transfer) they are doing everything among themselves. It is very secretive, as we say here, they are dividing the cake among themselves. We do not know which competences are being transferred and to whom and what will happen with the mangroves. We, (the civil society and traditional communities) have not been invited to participate, we are very worried"* (Marianeli Torres, C-CONDEM, telephone interview April, 2005).

Decisions concerning competences definitions, types of resources and geographical areas were all prepared by the CONAM despite the fact that this should have be done by

the MoE technicians and the NCC. CONAM's mission is only to give technical support in the general aspects of decentralization, not to do the whole process itself. As a result of CONAM taking charge of the whole process, elements of social participation clearly established in the EML, such as the DEMNS and the NCC, were not considered during the process. Basically, the determination of the transferable competences and the signing of the agreements were done between CONAM and the provincial and municipality governments. This fact could help to explain why the transfer agreement was so generalist and rigid.

The other non-appearance in the process has been of the other two autonomous governments (*juntas parroquiales* and territorial circumscriptions). Until now, the process has been directed exclusively to provinces and municipalities without any effort to include the two remaining autonomous governments. The *juntas parroquiales* and territorial circumscription are very important social actors and their participation has not only been granted by the national constitution and other laws, but constitutes the best mechanism for improving social participation in the decentralization process and in its implementation. The failure to involve them is again showing central government total disregard for the collective rights territorial circumscriptions have on their natural resources, also to the fact that local communities can play a pivotal role in the management and administration of natural resources.

One of the major obstacles that environmental decentralization faces is the lack of financial and technical resources. Provinces and municipalities are given all these new competences but until now there are no clear mechanisms for financial transfer. In the transfer agreements there is no mention of the type of resources (financial, material and technologic) that are needed for the implementation of the new competences. According to the Special Decentralization and Social Participation Law, "the transfer agreements should indicate with absolute precision, the financial, material and technologic resources needed to assume the new competences, and it will be an obligation of the central government to transfer this resources to execute the new attributions, functions and responsibilities" (Art. 12, CNE, 1997:4). The Province Council Consortium (CONCOPE) recognises that resources have not yet been transferred to sectional governments and warns that without this the decentralization process risk being ineffective, incomplete and limited (CONCOPE 2003b). This findings are similar to Rojas' observations about

decentralization in Latin America, according to the author decentralization has most often been instigated hurriedly and in disorganised fashion, reacting to political pressure rather than being part of an organized central government plan (Rojas 1999, p.24).

7.2.2.2 Natural protected areas system under decentralization

As shown in chapter 6, section 6.4.4, one of the most important elements used by the mangrove defence movement is the 'conservationist' approach that the government has used to manage mangrove ecosystems. The National System of Protected Areas (NSPA) has proven to be one of the best legal instruments used by communities and civil organizations for the protection and management of the remaining mangroves in the country. Changes in the NSPA system could have a tremendous impact on the way mangroves are managed in the future. This section will examine what will happen to the NSPA under the new decentralization process. I will argue that the current process of decentralization of the protected areas has not been harmonious with the National Constitution and the Special Decentralization Law, they certainly do not understand the ecological realities of protected areas; the risk is that the MoE is creating a complex administration map that it will be very difficult or impossible to implement.

The origin of the NSPA goes back to 1976 when the government created a National Parks Unit inside the Forestry Division of the Ministry of Agriculture and Livestock (MAG). A strategy for the protection of wildlife established the need to create 18 protected areas, which was later revised to 24 areas. In 1992, the Ecuadorian Institute of Forestry, Natural Areas and Wildlife (INEFAN) was created as an independent institution under the MAG to administer the NSPA. In 1996, the Ministry of the Environment (MoE) was created and INEFAN was transferred from MAG to the new Ministry. In January 2000, INEFAN ceased to exist and its functions were totally transferred to the Ministry of the Environment.

The NSPA was created with the objective of protecting the best examples of the ecological wealth of the country; the system has worked under the premise that protected areas do not follow any political-administrative divisions. They are normally located under different municipalities and even provinces and because they usually harbour several ecosystems and natural resources, they are under several government institutions' management. The main aim of the NSPA was to manage the assemblage of the protected

areas as a unified system. Keeping all protected areas under the same regulation and management framework has helped in overcoming its ecological and jurisdictional complexity, providing a reasonable integrated system that has achieved its primary objective.

Under the environmental decentralization process there is a risk that the integrity of the system will be compromised if each municipality asks for part or total administration as permitted by the decentralization agreements. To avoid this risk the central government tried to give certain directives (guidelines) to ensure that the internal unity of the system was kept and that ecological and institutional links were maintained in the protected areas assemblage.

One generic, but mandatory directive, is to avoid the dismembering of the NSPA. In this respect article 9 of the Special Decentralization Law determines that "municipalities will receive functions, attributions and resources to co-help in the preservation and conservation of the state patrimonial cultural and natural goods in coordination with the responsible institutions" (CNE 1997, p.3). In the same vein, article 13 of the EML ruled that provincial councils and municipalities will be able to dictate sectional environmental policies but will be subjected to the national constitution and the EML. It also states that national regulations on protected areas about the determination of soil uses should be respected and that representatives of indigenous, afro-Ecuadorians and local populations will be consulted for the delimitation, management and administration of conservation areas and ecological reserves[137].

What is interesting, is that even though the above directives were put in-place, the MoE (and CONAM) in its hurry to apply the decentralization rules, initiated the subscription of agreements for shared management with diverse regional agencies (provincial, municipal, and private). They used the Ministerial resolution 007 (MTA 2000) and the Ministerial agreement 055 (MoE 2001) which established as transferable to municipalities and provinces the competence to declare protected areas in their jurisdiction.

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[137] Article 13.- Los consejos provinciales y los municipios, dictarán políticas ambientales seccionales con sujeción a la Constitución Política de la República y a la presente Ley. Respetarán las regulaciones nacionales sobre el Patrimonio de Áreas Naturales Protegidas para determinar los usos del suelo y consultarán a lo representantes de los pueblos indígenas, afroecuatorianos y poblaciones locales para la delimitación, manejo y administración de áreas de conservación y reserva ecológica (CNE 1999b:4).

With these two administrative instruments the MoE started subscribing isolated agreements for decentralization or shared management in favour of several regional governments. The result has been the beginning of the dismembering of the NSPA (Ribadeneira-Sarmiento 2004).

Another interesting aspect is that article 72 of the Forestry and Conservation of Natural Areas and Wildlife Law (which is still valid) states that planning, management development, administration, protection and control of protected areas in the state are the responsibility of the MoE (CNE 1981); this competence has not been offered for transfer. Therefore, the sectional governments are allowed to declare protected areas, but they are not entitled to plan, manage, develop, administer, protect or control them. As it stands, this is still a MoE competence. This situation can clearly result in misunderstandings and conflicts between the central and sectional governments, as autonomous governments can assume that, because they are allowed to declare protected areas, they will be able to control and administer them. It does not seem very clear how one can declare them and not look after them, because, at the end of the day it comes to the same question, if the sectional government does not do it, who will?

It seems that the MoE have not estimated the effects that decentralization will have on the NSPA, not only on its financial administration, but also on the ecology of the protected areas. As with the other competences transferred, the MoE did not carry out an analysis of the real capacity of the receiving governments (or institutions) to manage the protected areas. There were no guidelines on how to proceed in cases where the protected area is located in more than one municipality or province[138]. The MoE has not understood the legal, institutional and ecological need to maintain the protected areas under an integral, connected system of national capacity.

As a result of what seems to be the end of the NSPA, several groups have formed in recent times. The groups are composed of local and regional academics and researchers with communitarian and civil organizations. Their objective is to advise the official MoE team in charge of protected areas management. Also they are attempting to resolve social conflicts created in the protected areas and to coordinate independent efforts which are

[138] A very interesting case is the National Park Sangay, located in 5 provinces (Tungurahua, Chimborazo, Canar, Morona-Santiago and Pastaza) and in at least 10 municipalities. The park is one of the most important and threatened natural reserve of Ecuador (Fundacion-Natura n.d)

being carried out in natural and ecological reserves. These groups have assumed the name of "local management committees" and they have become so strong that the MoE has developed a set of rules governing their functioning. In effect, the MoE had started to support these local management committees as a mechanism to avoid the dismembering of the NSPA. The mangrove management committee created in the REMACAM is one such group (see details on section 7.3.2.4). Unfortunately these management committees do not have real legal status and, as it stands currently the protected areas will eventually be transferred to provincial and municipal governments for their management.

To be coherent with the ecologic-environmental reality and the legal and institutional system of the country, the decentralization of protected areas should be done under a solid unified management system as is established by the EML and the National Constitution, and not through an isolated system as has been done up until now.

Interestingly the laws and regulations provided the framework for an effective, coordinated system, not only for the protected areas, but in general for the management of the environment. Elements such a DEMS, NCC and the environmental management unique system are there to create a harmonious, homogenous regulatory environmental system in the country. Unfortunately however, they have not yet been considered in the environmental decentralization process. I would argue, that the decentralization process was the best and maybe a unique platform from which the government could have introduced a harmonic, logical regulatory system for the environment and the management of natural resources. However, the way in which the MoE is implementing this process is undermining this unique opportunity. What it is doing is creating a series of local systems not connected to each other. The end result will be an administrative archipelago, where each environmental management island will be isolated from the others, with an end result of an unprotected environment in Ecuador.

7.2.3 Mangrove management under decentralization

7.2.3.1 Transferring mangrove competences

Among the transfer competences put forward by the MoE (see annex VIII), the competences type-a will be applied to mangroves, as mangroves are considered by law to be a forest ecosystem. According to these competences, the provinces and municipalities will essentially be in charge of all mangrove activities, from the formulation of policies,

reforestation and rehabilitation, to the establishment of natural resource exploitation bans. The competence 11a is the only one that refers specifically to mangroves, "to allocate concessions for traditional use of mangroves and wetlands" (Real-Lopez& Bedoya 2004). So, from now on, custodies will be the competence of municipalities and provinces as the rest of mangrove management and administration.

Currently four provinces have asked for the transference of competence 11a. Looking in detail we can see that provinces such as El Oro and Manabi (which posee mangroves), did not assume competence 11a, but interestingly Zamora and Loja, located in the sierra, where there are no mangroves or important wetlands, have assumed competence 11a. Municipalities such as Mocha, Patate, Montecristi and Tosagua have also elected this competence, even though they do no have mangroves or wetlands due to their location and ecological circumstances (all in the mountains). These examples illustrate how the MoE has allowed provinces and municipalities to pick and choose whatever competence they want, without taking into account the geographical and ecological characteristics. If the MoE applies a logical framework to transfer competences taking into account aspects such as geography and ecological conditions, these types of errors would be avoided.

7.2.3.2 Are the municipalities up to the mangrove job?

As a result of this uneven roll out of new legislation, mangrove defence movements and local communities are very sceptical about whether municipalities have the right resources (financial and human), or willingness to protect the mangroves or use them sustainably. In the coastal areas, mayors are not the most trusted authorities, especially in Esmeraldas:

> *"Take the example of Muisne, you know we have been fighting for more than 4 years to get rid of Buchelli[139], the most corrupt major in the region. Image what will happen if the municipality decides to ask for the transfer of the competence 11A. The mangroves and the people will be in serious trouble, what will be the future for the mangroves under his mandate or somebody like him?"* (Lider Gongora, ex-president of FUNDECOL and current C-CONDEM executive secretary, interviewed July 2003).

[139] Buchelli has been Muisne's mayor for more than 20 years. He has been thrown out of town by the people but even though he has several court hearings for corruption, electoral ringing, illicitly obtaining wealth he is still the mayor. FUNDECOL has run a long campaign to take him to justice (Mercurio 2003, Burbano de Lara 2004, Hoy 2004, Toro 2004).

These worries have been echoed in the REMACAM as well as the reserve is located in two different municipalities (San Lorenzo and Eloy Alfaro):

> *"Even though the current mayor of San Lorenzo has a sympathetic ear to the mangrove plight, this is not the case with the Eloy Alfaro mayor. We can demonstrate with minutes of our meetings and reports, that he has never been interested in the mangrove areas and does not have any idea of what should be done, the only time he visits the mangrove communities is during election time to ask for their votes"* (Andres Carvache, member of the REMACAM mangrove committee, interviewed, July 2003).

Neither of the municipalities have the expertise, and the resources to deal with mangrove management.

> *"Until now the REMACAM local mangrove committee has worked quite well because we have the mangrove project and the MoE reserve office here, without them it will be impossible to deal with the problems and conflicts of the area, there is no body either in San Lorenzo or Limones municipality with the experience or the training to deal with mangroves"* (Carlos Rodriguez, REMACAM director, interviewed September, 2002).

The other potential problem is that once municipalities and provincial councils get the transferred powers, they can invalidate the custodies that the ministry has already given to the local communities. The other possibility is that they decide to give custodies to investors, because there is no supervisory body in place after the competences are transferred. Research into the Colombian and Bolivian decentralization process has shown how decentralization has increased local rulers' power (van Cott 2000), and there is no mechanism to stop the same happening in Ecuador.

A clear example of the negative events that can happen in the mangroves under municipality administration is the recent consent given by Eloy Alfaro mayor to the International Migration Organization (IMO) *"they [IMO] were allowed to clear 8 hectares of mangroves for the construction of a water aqueduct for Limones and they [IMO] refuse to replant the mangroves in another area because they have the support of the municipality"* (Maximo Canga, REMACAM ranger, e-mail communication, September, 2004).

With regard to this incident, Edgar Lemos, mangrove project director and member of the local mangrove committee stated:

> *"We understand, that the water aqueduct is a very important public work, but this is a ecological reserve and neither the mangrove committee nor the REMACAM unit were not consulted or informed about this. I know we should have found a compromise, the problem is, that the municipality does not care about mangrove protection and totally disregards the mechanism we have in place for the management of the reserve. We have the mangrove committee, and we still have the ministerial office, but they do not care"* (telephone interview, November, 2004).

Mangrove clearance is not over in Ecuador. In other provinces (such as Oro and Guayas) it is still a common occurrence, that is made possible by corrupt municipal and provincial authorities (C-CONDEM 2004),

> *"giving them mangrove management is like giving a thief the keys of your house"* (Marianeli Torres, telephone interview January, 2005).

7.2.3.3 Does the MoE know what is happening?

One of the most pressing worries is the perception that the central office of the MoE does not really know what is happening with the mangroves under the decentralization process:

> *"In meetings they (the ministry officers) have been telling us that mangrove competences are being transferred and that the MoE has no obligation to look after the mangroves any more. From now on mangrove administration will be in the hands of provinces and municipalities, but we do not think that is the case, the forestry law is still valid and under its mandate mangroves are a responsibility of the MoE"* (Alfonso Roman, C-CONDEM senior lawyer, telephone interview January, 2005).

Following Alfonso's remarks I reviewed the National Constitution and the laws that are still valid to see what has changed for mangroves under the new decentralization regime. What I found was that under the National Constitution, article 248, the central state still has the sovereign right over biodiversity, natural reserves, protected areas and national parks and it has the mandate to conserve and use these areas with the participation

of the local populations (ANC 1998, p.76). Also, revising the National Decentralization Plan (NDP) I found a very important issue, that can change the way mangrove competences have been transferred by the MoE. The NDP clearly establishes that the administration of fragile ecosystems (glaciers, mangroves, wetlands and *paramos*) are a central government competence and correspond to the MoE to establish policies and rules to administer them. The provincial and municipal governments could help in their management but fragile ecosystems are the MoE responsibility (CND 2001b, p.19); this piece of legislation is very clear and there is no doubt that mangroves, whether they are protected area or not, are the responsibility of the MoE, so under no circumstance should the MoE transfer mangrove competences to the sectional governments. In doing so, the MoE is confirming the perception that they do not really know what should be done with mangroves under the decentralization regime.

7.2.3.4 Mangroves and NSPA's fate

As mentioned earlier (chapter 6, section 6.4.4), protected areas regulations have been one of the pivotal weapons in the defence of the mangroves in Ecuador and the decentralization process is basically dismembering the NSPA, creating a complex administration map for protected areas (section 7.2.2.2). The importance of the NSPA for the conservation of the remaining mangroves cannot be stressed enough. Through the NSPA, local communities have been able to defend the last remaining, fully functional, mangroves in Ecuador and it is through the NSPA that C-CONDEM has been able to engage with the MoE.

> *"The fact that the NSPA was a unique system has give us the possibility to negotiate with only one institution and the possibility that any change approved by the MoE did apply to all mangroves in the country, this made our task much more easy as we could focus on only one authority. Because that was the highest environmental authority of the country it was so much easier to make it accountable, now we are very worried, we do not know what is going to happen with the REMACAM or Muisne for example, there is no clarity, so we fear the worst",* (Marianeli Torres, coordinator of C-CONDEM, telephone interview January, 2005).

At the moment, REMACAM is still managed under the old regimen, as Esmeraldas provincial council or municipalities have not yet signed any environmental agreements

with the MoE as at April 2005. The MoE still has a regional office in Esmeraldas city and a reserve management unit in San Lorenzo. The unit is composed of a reserve director, secretarial and administrative personal and four rangers who are distributed in different communities (Olmedo, Tambillo, Pampanal and Palma Real). With help from the mangrove project (FEPP) a management committee was set-up in 2001 with representatives from grassroots organizations (FEDARPOM, FEDARPROBIM), the MoE (REMACAM unit), navy, police, and a representative of the C-CONDEM. The committee is a good way of engaging with the spaces opened by the new participation reforms and provides a very important platform from which to coordinate actions to manage the reserve and for a prompt identification of problems and conflicts, as well as to maintain links with the central administration in the MoE. The committee has made it possible to establish a dialogue in the REMACAM area and has given voice and representation to local and grassroots organizations. Nevertheless, as analysed in the section 7.2.2.2, these committees do not have any real legal status, so if municipalities take charge there is no obligation for them to continue with the committee.

In reality, what decentralization is doing at the moment [in the way it is being pursued by the MoE] is adding yet another layer to an already complex mangrove management system. Also the process is putting at risk the integrity of the NSPA, one of the most important systems for the protection of Ecuador's rich ecological diversity which has proven to be a very important mechanism to protect mangrove areas. During the process, the MoE has shown neither leadership nor the appropriate knowledge. As a result, functions that should never have been transferred were transferred to regional governments with the end result being an eroded MoE, which will be even more weakened when economic and technical resources get transferred to provinces and municipalities. Another large gap in the process is the complete lack of involvement of social actors, which demonstrates that social participation rhetoric has gone no further than the government's and development agencies glossy brochures. This is why the mangrove defence movement remains vigilant trying, to follow the government steps: *"We can see black clouds forming over the mangroves and Ecuador's natural resources. We can visualise several dangers in the near future, the prognosis is not good, that is why we are now on permanent alert through the National Environmental Assembly. We need to get ready for a new battle in*

the defence of our natural resources and livelihoods" (Marianeli Torres, C-CONDEM, e-mail communication, May 2005).

7.3 Engaging with neo-liberal reforms in the REMACAM

In the REMACAM area I found two different approaches to engaging with the new participation and decentralization shift. On the one hand, a proposal for an afro-Ecuadorian territory in the north of the Esmeraldas province: *La gran comarca territorial* (CANE) which is one of the core elements of the black movement represented by the PCN (Process of Black Communities). Similar to many other black movements in Latin America, the PCN has made race one of the defining factors of their identity (Handelsman 2001). Their movement is based on identity formation and political mobilization in the context of political and constitutional reforms associated with processes of ethic and collective rights and cultural difference. For the PCN, the relation territory-identity is seen as central to the reconstruction and maintenance of the black identity in the country, *"for us, identity is totally link to the territory. We live, recreate and maintain our identity only when we live in our territory"*[140]. In that context the designation of a black territory will be pivotal for their recognition as a cultural and political force in the country.

The second approach is the one used by the mangrove defence movement. For them the REMACAM is a political bastion in their struggle against the shrimp farming industry. Also, because the area harbours the last fully functional mangrove system and traditional resource, exploitation activities have not yet been displaced. The REMACAM has become a laboratory in their efforts to find new communitarian management strategies. As explained in chapter 6, section 4.4, the creation of the reserve is the first example of C-CONDEM engagement with current reforms, and how the REMACAM set up is the result of a new communitarian/environment narrative. This uses environmental, cultural and ethnic elements and takes full advantage of the spaces opened up by the reforms in the government legal framework. In this context, C-CONDEM supported by local communities and the Mangrove Project initiated a stewardship practice call *custodias*. Under this practice the government (represented by the MoE), is allocating mangrove areas to the communities for their use and management. PCN and C-CONDEM are also

[140] Nell Pimentel, PCN member, comments presented during Identity workshop, San Lorenzo, February 2001.

engaging with the new neo-liberal reforms through the presentation of an ethno-education proposal (section 7.3.2) and a Mangrove Conservation Law (section 7.3.4).

7.3.1 La Gran Comarca[141] Territorial (CANE)

Using the newly acquired rights given by the 1998 National Constitution, the PCN has presented a proposal to the Ecuadorian government for the creation of an autonomous territory for the black communities. Their proposal is using the figure of territorial circumscriptions (see section 2.1), under which the north of Esmeraldas will become an independent territory in the same way that indigenous territories and districts are. This black territory will have their own political, social and economic organisations and black communities inside it will gain land property rights with collective management rights over all the natural resources harboured in their territory. The main objective of CANE is to promote the well being and improve the quality of life of the black people living in the San Lorenzo, Eloy Alfaro and Rio Verde cantons. It also aims to carry out the mandates of the grassroots groups (Morales 2002). According to the rules (PCN 1999) any black community with a communally used territory with a physical presence in an area of continuous occupation with a minimum of 4 generations (100 years) can belong to CANE.

7.3.1.1 How CANE will function?

CANE will comprise black communities from three different cantons: Eloy Alfaro, San Lorenzo and Rio Verde. The communities inside CANE will be organised under the following model:

1. Communitarian councils (grassroots or base organization)
2. *Palenque*[142] council (second-tier organization,)
3. Regional *palenque* council (third-tier organization)

It is important here to understand that this model uses the formal social organization structure already in-place in the country. Grassroots, or base organizations, refer to local groups and/or cooperatives; their field of action is the community. These, in turn, form the second-tier organizations that take the form of associations, unions or federations, and are frequently affiliated with provincial or regional organizations. The third-tier organizations are the overall coordinating body.

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[141] Interestingly Comarca (or Comarque) is the administrative division of Catalonia, Spain. The *comarca*, according to the law, is a regional territorial entity, divided into municipalities (See: CETADEC 2005).
[142] Name given to fugitive (escapee) slave communities in the colonial time, see section 7.3.1.2 for a detailed analysis.

In the REMACAM I found 25 grassroots groups associated to the federations. There is one federation per each canton: FEDARPOM in San Lorenzo, and FEDARPROBIM in Eloy Alfaro, with REMACAM having two representatives in CANE. Under CANE each federation will be call *palenque.* Although the name is changed, the structure within the federation is the same as any other legally recognised communitarian group in the country. The directive board has a president, vice-president, secretary, someone in charge of the accounts, and someone in charge of legal tasks. These roles are kept under the CANE rules, but the names are changed for new names adapted from lingala[143] words and some names used in the extended family system in the afro-culture (see table 7.3).

Table 7.3 Federations directive board roles and origin of new names use by CANE

Role	**CANE name**	**Origin**	**Meaning**
President	*Bandeko* mayor	Lingala	Elder brother
Vice-president	*Bandeko* menor	Lingala	Younger brother
Secretary	*Sekele*	Lingala	Secret keeper
Accounts	*papa grande*	Afro-culture	Grand father
Legal	*Ñaño*	Afro-culture	Little brother

Source: author's adaptation from CANE documents and meetings.

The directive board of the Regional *Palenque* council has also adopted some names of Lingala origin (such as *Bambero*[144]) and others from the afro-culture extended family system, among them *Compadre* and water godfather. The president and vice presidents names are replaced by elder *Palenquero*[145] and minor *Palenquero.* According to Minda (2002) the use of names from the afro-culture, is an effort to recuperate and to assimilate, the roles that some people play in the afro-communities, and to give them a social responsibility in the organization system. I argue that with the use of afro, Lingala and *palenque* names, the process is incorporating ethnic features into the existing nation-state structure and constructing a new strategic politization of identity and culture.

7.3.1.2 The Palenque as a cultural symbol of resistance

It is very important to understand the meaning, and the importance, of the word *palenque,* and to realize why this type of territorial unit has been chosen by the PCN as the

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[143] As part of the PCN ethno-education proposal (see section 7.3.2.1) the Lingala language is being proposed as the new afro-language.
[144] Adviser in Lingala, normally a old person
[145] *Palenquero* was the supreme chief of the *palenques* during colonial times.

organization's basal unit of CANE. *Palenque* was the name given to the territories occupied by escapee slaves (maroons) during the colonial period. Literally, *palenque* means palisade, referring to the palisades set up by the black slaves to defend the areas where they took refuge after escaping from haciendas and mines (Friedemann (de)& Arocha 1995). The palisades were normally erected as a line of defence against the enemies and to demarcate the territory. The *palenques* were normally built in dangerous and inhospitable areas, as those terrains offered very good natural protection against the Spanish army.

The *palenques*' initial organization was simple, as the main objective was that of defence and attack. They had a supreme leader (or king), a war lieutenant, a watch man, an accountant and a religious leader and split into groups of 8 to 10 men. Houses were built around the Major's (supreme leader) house, and the supreme leader was in charge of organising the work, and taking decisions within the community (Jaramillo-Uribe 1986). The economy was fundamentally subsistence agriculture, complemented by fishing and hunting. In the beginning, attacking other *palenques* and towns was very important as a source of cows, weapons and women (Muhammad 1995).

Palenques were not only sites of refuge, but became symbols of autonomy, and resistance against slavery, and the Spanish crown during the seventeenth century. Some authors have argued that marooning, and *palenques* were the earliest successful rebel movement against the Spanish crown. For example, in the 1970's researcher Roberto Arrazola declared them to be the first free pueblos of Latin America (cited in: Friedemann (de) 1997, Viafara-Valverde 2003).

Another important element is that *palenques* are argued to be the connecting bridges between Africa and America (see: Friedemann (de) 1997, Whitten& Quiroga 1998, Schwegler 2000). Some researchers have argued that inside the *palenque,* black slaves recreated their African ancestry, and that their origin suggests a presence of the African memory. For example, Friedemann explains that *palenques* have equivalents in Guinea and the Congo where, armed men from fortified base camps called *kilombos,* resisted against the slave trade. She argues that it is possible that slaves from Guinea and the Congo brought memories of the African *kilombos* and reconstructed them in America

(Friedemann (de) 1997). It is interesting to note that the word used for *palenques* in Brazil is *quilombos*.

Nowadays black activists have adopted Maroonism and *Palenques* as symbols of freedom and rebellion against the societal discrimination and government apathy and as the connecting bridge with Africa. As *palenques* are represented as the first seeds of freedom and autonomy, the name has been adopted by the PCN and other groups as an historical recognition of the black people's struggle for autonomy and to rescue their African roots (see for example: Grupo-Cimarron 2004).

What is interesting to note here, is that *palenque* is the cultural form of organization that makes this group of people different from 'the other', and is the equivalent in socio-political terms to the indigenous people's traditional assembly *(asambleas)*. Through the use of the *palenques* figure, the PCN is using a binary representation, they are the cultural 'other'. This binary representation has been shaped by the links the PCN has with the Colombian PCN. The Colombian process has been a source of inspiration and support for the Ecuadorian PCN. There is constant interchange between the two groups through bi-annual meetings. The Colombian process sprang from the country's constitutional reforms in 1991, and the Black Communities Law (Law 70) approved in 1993 (Romero& Lane 2002). This process has been very successful. By 2001, the Colombian government had allocated 80 collective titles to properties in the Pacific coastal region, covering 3'728,000 hectares, and benefiting over 36,500 families (DNP 2002), the process also has a very high profile internationally (for a good account see: Wade 1995, Escobar 1997, Pardo 1997, Grueso *et al.* 1998, Pardo 1998)

7.3.1.3 CANE rules and tensions

The CANE will have a set of political rules based on the Ecuadorian law for territorial circumscriptions and a management plan. The CANE structure seems straightforward, rules and management plans will be executed through the communitarian councils. The communitarian councils are formed by different grassroots organizations in the communities, and will send a representative to the *palenque* council. *Palenque* council representatives will comprise the regional *palenque* council (RPC). Every 6 months the representatives of the regional *palenque* council will meet in what is call a *Kosangana*[146],

[146] Lingala word, meaning to meet (see Kapenda, 2001).

and every year the regional *palenque* council will convene a general assembly with representatives of all *palenques*. This assembly is denominated *Parlamento*[147], and according to the statutes and rules, the *Parlamento* is the maximum authority of CANE. During the *parlamento,* all issues relating to the *palenques* will be addressed and the resolutions will be followed by all the *palenques* and communitarian councils.

According to PCN leadership, this structure is their own (*propia*) and has been devised to make representatives accountable to their grassroots groups. Under CANE rules other organizations such as NGOs, can be invited to the *parlamento*, but they will not have a voice or vote, the only way they can have a voice is for one of the legal delegates to give it to them. Under no circumstance will they have a vote,

> *"we can invite NGOs and other organizations, but they will not be able to vote, only legally recognised representatives will be able to vote, we do not want colonels without headquarters"* (Pablo de la Torre, I Parlamento CANE, June, 2002).

This ruling has already created tension and friction inside the process. During the first *parlamento* (June 2002), a representative[148] of one of the environmental NGOs working in the area asked what will happen to people like Juan Garcia, Nel Pimentel and Jacinto Fierro? All of them are black, intellectual activists that started the PCN years ago, and have been the public and academic face of PCN for a long time. Under the new CANE rules there is no possibility for them to have a say in the process as they do not belong to any of the grassroots groups. The answer to the question was simple,

> *"this is an ethnic process, different and unique in the country, we decide the rules, we are now the authority, so this is the last word"* (Pablo de la Torre, I Parlamento CANE, June, 2002).

This example illustrates what the black anthropologist Pablo Minda calls the autistic phase of the process,

> *"at this very moment the PCN is going through what I call the autistic phase, they have closed in upon themselves, they do not want to hear, or to*

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[147] Another adopted word by the PCN, its origin has not being explained by the PCN. *Parlamento* is the Spanish literal translation of Parliament. In Ecuador the government equivalent to the British Parliament is Congress (*congreso*).

[148] This person is black and have been part of the PCN for a long time, as member of an NGO he will not have voice or vote in the process.

share with anybody. I think it is understandable, they have never had any power, and now they want to grasp the power given to them, and they do not want to share it with anybody" (Pablo Minda, interviewed March 2003).

I would argue that PCN position challenges those who have argued that the afro-Ecuadorian process is in the shadow of the Ecuadorian indigenous movement. Walsh and Garcia (2002), explain how the afro-Ecuadorian process is always being compared with the indigenous movement. In this comparison, blacks appear as weak and fragmented, incapable of organizing themselves and of mobilising the production of their own thinking (Walsh& Garcia 2002, p.3). So, CANE structure and rules are to me, not only challenging this comparison, but looking for a collective reconstruction of their identity[149].

The tensions are not only manifested with outsiders, but also inside the process, representatives from the grassroots groups complain about the structure given to CANE.

"It is the same as any government structure, it is pyramidal. We proposed a more ample, horizontal structure but the leadership did not want to hear that, I was thrown out of the process because I asked them to think about other types of structures, something that allows us to get closer to the grassroots groups. One representative for several local groups is not enough, especially because you know how people get elected here, if you are the relative of this or that you will be elected. We are just replicating the dirty politics of the country" (Genaro Perea, Palma Real community, interviewed November, 2002).

Others believe that CANE is just an intellectual discourse, constructed to give prominence to the black process in general, but that has never trickle down to the local communities

"Look we have been working here for more than 5 years, visiting the communities and working with them all the time and the communities never mention CANE, they know about the Federations and about the mangrove defence movement, but they do not know about CANE" (Wilsington Ortega, mangrove project technician, interviewed November 2002).

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[149] Anthropologists and historians could also argue that CANE rules can be compared to some of the rules in the colonial *palenques*; for example Friedemann (de) (1997) describes how one of the rules of life in the San Basilio *Palenque* was, that only black people are allowed in (with exception of the priest).

Whatever the representations, CANE is a legitimate proposal that is totally viable under the new national constitution and if approved would make a new trajectory in natural resource management in the Esmeraldas region.

7.3.1.4 CANE and mangroves

If the government approves the CANE proposal, the REMACAM mangroves will be under CANE's management, so even though the proposal is still in its infancy, it is important to explore the PCN's discourse about mangroves, and their relationship with the mangrove defence movement. As explained in chapter 6 (section 6.2.3.4) there are some disagreements between C-CONDEM and the PCN, however I found that these differences get blurred in the field. The mangrove defence movement in REMACAM works through FEDARPOM and FEDARPROBIM, the same federations recognised as *palenques* in CANE. These are the only organized groups recognised by the government, and it is through them that the government interacts with the communities. Also, it is through these organised groups that mobilizations and protests are organized, they have representatives in the Local Mangrove Committee and in the C-CONDEM and its members have been very active in the fight to defend the mangroves.

However, the PCN is an ethnic movement whose territorial claims are based on land titling for agricultural land and forest (See: Minda 2002, p.78). Yes, it is true that they claim forest, and other natural resources in their territory, but they do not have a defined strategy to protect them. As C-CONDEM has included ethnic elements in their narrative, the PCN has included some environmental elements such as rational use and sustainable management of natural resources, but a focus on territorial rights, more than natural resources protection is at the core of their strategy. In this sense it could be argued that mangroves are a marginal resource in their strategy as it is impossible to claim land titling rights over them. For example, in a meeting between the PCN, the mangrove project and the MoE Segundo Quiñonez (vice-president of FEDARPOM) proposed that mangrove areas should be titled, because the custodial system did not have any political weight.

> *"Custodies are not real property, the only way mangrove areas could be defended is with CANE. With the custody the only thing that is happening is that the community is replacing the State in its obligation to look after the natural resources"* (Meeting at mangrove project office, May 03, 2002).

7.3.2 Articulating knowledge for identity (re)construction

Knowledge is an essential part of what we can call the PCN's environmental discourse. They claim that black communities hold a set of ancestral mandates, and a collective memory, inherited from African cultural traditions that allows them to look after their natural resources in a sustainable way, and that forest and other resources are still there because, they (the blacks) have looked after them (Garcia 2001). This set of ancestral mandates and the wise cultural practices, make them the inheritors of the natural resources and give them rights, to extract timber and non-timber products and, to hunt and gather in forest and mangroves (PCN 1999, p.20).

The ancestral mandates and the collective memory have been transmitted as part of the oral tradition from generation to generation, are an intrinsic part of their culture and help determine their cultural practices and the way they use their resources. Black communities they claim, have an ancestral respect for their environment and, they have accumulated knowledge over the centuries of living in the area. They have created a set of norms (cognitive, normative and symbolic) to regulate the use and management their natural environment (FEPP-Manglares 2001, Garcia 2001).

These claims, however, are contested by academics, NGO workers, scientists, some black activists and also activists from the mangrove defence movement who think that the ancestral mandates and collective memory have been badly eroded and, in many cases lost, especially in the mangrove area. They argue that it is almost impossible to find surviving African traditions and knowledge in the black communities of Ecuador due to the conditions during the colonization process, the cultural imposition and the way the black communities were formed back in the 1500's. Knowledge in the area they say, is a mixture of day to day experiences, traditional practices and exogenous knowledge. These arguments can be equated to those of scholars working in the Andes, for example Howard *et al.* (2002, p.2) argue that in the light of cultural *mestizaje* it is often vain and invidious to attempt to unravel Spanish and indigenous elements of knowledge. Instead they see knowledge as turbulent fluid layers of interactions where the boundaries are constantly redrawn.

Although these arguments are not totally accepted by the PCN there is a tacit recognition that ancestral mandates and collective memory are being lost. For example, in

the second bi-annual meeting between PCN Colombia and PCN Ecuador they stated: *"Black populations have maintained an ancestral management in the region for 400 years. However, we are now facing problems. These problems have appeared due to the rupture of the balance that was maintained during the past"* (Zuñiga 1998, p.9).

Another important aspect that has an indirect impact on the erosion of traditional ways in the REMACAM rural communities is the fact that the economic development policies in the north of the Esmeraldas province have been based in natural resource exploitation, which has made it easier for cultural impositions. The people from the Sierra (normally *mestizos*), who have come to exploit the natural resources, have imposed their culture on the afro-Ecuadorians, where the afro is under-valued and over-looked. As Juan Garcia (historian and black activist) described it:

> *"because the state does not recognize our identity, our values and our history, black people do not have a recognized identity. The black has lost its conscience of being black. It denies its race. Some black people do not feel black, they are trying to whiten themselves, these people have an inferiority complex. Still, we have not been able to overcome our slave condition"* (Presentation Identity Workshop, San Lorenzo, February 2001).

This is a very strong argument that may be seen as really harsh if it wasn't expressed by the most important intellectual founder of the PCN. Many of the activists recognised that this is a major problem among the black communities, especially among young people. There is a sense of 'this is not me', a culture of negation. Values, customs, beliefs and their own ways of doing things are transgressed and lost. With the new generation the role models have changed:

> *"today nobody remembers the tunda, that spirit (vision) that used to get us lost in the middle of the mangroves, now I ask, who is going to rescue us with the sweet chants (arrullos) from the visions of the mangroves?"* (Don Eche, interviewed in San Lorenzo, February 2001).

This process of *desarraigo* (lost sense of belonging) is seen as the result of what they call the Spanish education model, a structure that has systematically under-valued and ignored the afro element and, imposed values from other cultures, making the afro culture disappear. As one of the PCN leaders put it: *"In Olmedo today nobody talks about*

marimba, contrapunteo or even decimas, very quickly we are losing our cultural roots, our identity, our sense of belonging" (Pedro Segura, President of APACOBIM, Olmedo meeting, November 2002). These dislocations make it easier for the people (especially the young) to leave their territories and to migrate to the big cities.

7.3.2.1 The formal education system

The actual education system is seen by the PCN as the continuation of the acculturation process that black people have undergone since they arrived in the new world as slaves. School and church have walked hand in hand in the process of education and Christianization of the "wild" black people. According to them it is clear that since the conquest, the education given to indigenous and non-indigenous children in Ecuador is an education designed to reproduce, cultural domination, racial discrimination, economic exploitation and political manipulation in each historical stage. In other words the school has been a very important and powerful instrument for the state to impose the dominant *mestizo* culture. In an interview with one of the PCN representatives he expressed this sentiment clearly:

> *"the "Spanish" education model has not allowed us to reaffirm ourselves, or to re-discover us. This education has been the way of taking our cultural values and our pride, it has made us invisible in the eyes of the nation, and in our own eyes. Formal education has wiped out our heroes, our history, and ourselves"* (Walter Pasmiño, President of UONNE *Palenque,* Interviewed June, 2002)

What is really interesting is that a very high percentage of the PCN leadership are teachers themselves, so they are the vehicles through which this Spanish education model is imposed, as Ines Morales (one of the maximum representatives of the PCN) expressed:

> *"Every day I open the teaching books and there are only whites and mestizos there, they are the ones that have made this country grow. They are not blacks, and I ask myself, why we (the black teachers) continue to teach this to our pupils? Our role in the classroom is not only to teach them about the others but also about ourselves as well. We need them to feel proud of what black people have done for this country, so that they can identify themselves with those people and not only with the mestizo and the whites. That is why we (the black people) do not identify ourselves as black, we are ashamed to*

be black, we want to be something else, the school have taught us that" (Presentation during CANE First *Parlamento*, San Lorenzo June 2002).

Throughout these arguments it is possible to see that PCN's worries about the formal school system are expressed in terms of losing the black identity. C-CONDEM is also worried about the formal school system, but in their case their concerns are about losing the mangrove insider perspective. According to C-CONDEM, the mangrove outsider perspective does not only manifest itself through laws and legislation, they think that the school has also become a very important vehicle for other ideas and perspectives to permeate into the local communities as Marianeli Torres said, *"to take the mangroves out of the heart of the people"* (see chapter 6, section 6.2.3.4). Despite the government reforms for a decentralized, culturally appropriate and pro-indigenous education (see: Laurie *et al.* 2003), the school texts and curriculum are still produced in the capital, there is not a real mechanism in place to modify the curricula according to the socio-cultural characteristics of each region. So, in the mangrove communities children still learn to read and write using curriculum and text produced in the sierra, which are totally de-contextualised. For example, when learning the letters from the alphabet their texts use examples that are totally out of context. Table 7.4 shows some interesting examples found in the reading text used in local REMACAM schools and the substitute words proposed by FUNDECOL in their teaching materials (see section below).

Table 7.4 Learning to read in the mangroves

Letter	**Current example**	**Substitute**
I	Igloo	iguana
C	Car	cockle or canoe
E	Elephant	estuary
P	Penguin	plantain
M	*Manzana* (apple)	mangrove

Source: adapted from school reading text and (FUNDECOL 2000a)

This is just a very small sample of the out of context teachings the children are receiving, without doubt these examples can be extrapolated to the rest of the courses.

"through the actual education system the communities are losing their own spaces, the real perspective of what they are, where they live, this is replaced by empty communication ways, without references and out of context, they

become part of a homogenous culture" (Marianeli Torres, C-CONDEM, interviewed November 2002).

This de-contextualised education is separating children from the local systems of beliefs and practices within their local environment, so children's perceptions of their environment and the way they relate to it is changing, due to the knowledge they get at school: they do not recognise themselves as part of the mangroves for example, they do not appreciate the mangrove resources, additionally they do not believe in their parents. The old traditions and beliefs are seen as backward and as some of the youngsters told me "these are just lies, the old people just tell lies". These ideas are parallel to some of the ideas articulated by the PCN, which can be traced to those of the indigenous movement that for long time have demanded cultural appropriate education that reflects indigenous everyday realities and practical needs (Laurie *et al.* 2003). The difference is that C-CONDEM is concerned about the cultural-ecological integrity of the mangrove ecosystem, and want to position the mangroves back at the heart of the traditional communities that depend on them. These different focuses have resulted in two different contestations of the formal education model, on one hand the PCN ethno-education proposal (see 7.3.2.1) and on the other the C-CONDEM social communitarian education programme (see 7.3.2.2).

7.3.2.2 Contesting the formal education model: Afro-education

Based on the premises that the current formal education system has allowed for the discrimination, marginalization and invizibilization of the black element in the Ecuadorian history, the PCN is demanding a culturally appropriate education, and is developing a ethno-education proposal to be presented to the government. According to them, the new legislative framework and the curricular changes in the education system give room for this proposal to be approved[150].

In their proposal, ethno-education is defined as the exercise of learning under their own terms and is a tool that will allow the black communities to win their fight against the government.

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[150] The constitutional recognition of Ecuador as pluricultural state in1997, framed an acknowledgement of the diversy education needs and realities of the national population. Articles 67 and 68 stated that public education will be non-religious and that the national system of education will include teaching programs according to the diversity of the country. According to PCN these two articles give them room to present their etho-education proposal (PCN 1999).

> *"We need to teach our children that being black is good and we have to be proud of it, and that this (being black) dignifies us"* (Pablo de la Torre, presentation CANE *Parlamento*, June 2002).

Their main mantra of the process is: *"if we don't know where we come from, it is impossible to see where we are going to"* (quote from Abuelo Senon, CANE *Parlamento* June 2002). According to Ines Morales the proposal is trying to draw not just on the leaders of the process, but also to go to every locality to find out what the people want, where they are coming from and where they are going to.

> *"For the first time the Ecuadorian constitution is recognizing us, so, now we need conquer that by recognizing ourselves. We need first to workout our identity inside our communities, so then it is recognized from outside"* (Ines Morales, presentation CANE *Parlamento*, June 2002).

The ethno-education principles devised by the PCN are:

- The syllabus of study should be according to the black people's reality, it should incorporate the contents of black history, our costumes, our doctrines and should make the other (the dominant society) know our great leaders, the leaders of the *palenques* like Alfonso de Illescas.
- The government should take into account in the current curricular reform, the existence of the black people and our specificities.
- Black and *mestizo* teacher should be teaching thematically black history, through workshops and using texts of our own history.
- Communities should encourage the teachers to live in the communities, and to fulfil their mission to teach and form our children in a clear and concrete way.

The PCN and the black activists feel the need to turn around the Spanish model that has not allowed them to be themselves. They need to reaffirm themselves, to re-discover who they are, to rescue the cultural values and pride that the Spanish model has taken away[151]. Because the formal model has made them invisible in the eyes of the nation and

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[151] It is important to note here that these demands are very similar to the indigenous movement demands which have led to successfully reforms of the state education policies. Ecuador's National Directorate for Intercultural Bilingual Education (DINEIB) was created in 1988. In 1992 the Education Law was reformed giving DINEIB technical and administrative autonomy (Moya 1998). Ecuador's Intercultural Bilingual

also in their own eyes, they need to make themselves be seen and heard, to rescue their own heroes;

> *"for example in the cities there are statues of Spaniards and mestizos, but there is not a single commemoration of the black heroes, for example the black battalion that fought in the battle of Pichincha*[152]*. The country does not recognise what black people have done for this country, that is why we want the black history to be told not just to the black pupils, but to all Ecuadorians as well"* (Alejandro Caicedo, PCN leader, interviewed, June 2002).

Taking these ideas on board, at the core of the proposal is the aim to allow black children to get to know their cultural identity, but more interesting is that the black cultural identity and its history should be taught to all Ecuadorians as part of the national curriculum. In this way it is argued the black communities will get the respect for their ethnic and cultural diversity as approved in the 1998 National Constitution. To be able to do that, they plan to elaborate a programme of study for primary and secondary level that incorporates black history and culture. These ideas mirror the Colombia ethno-education process initiated by the Colombian PCN. The Colombian process has already started, the reform has been approved by the government and the Ministry of Education together with the Colombian PCN have elaborated the general afro-Colombian education guidelines (MEN 1996), also the curriculum (CORPIDENCU 1999) and as part of the teaching materials the Colombian PCN has produced a book of the history of the black people in Colombia (PCN-Colombia 1998).

Some black teachers do not want to teach anymore about Sebastian de Belalcazar, Sucre or Simon Bolivar,

> *"they want to know and teach about Illescas, Anton, but they do not have anywhere to get the information from, there are no books about black history in Ecuador, so we need to produce those book, we need to research to find out so then we can teach it to our students"* (Walter Rincon, President of the FEPALUM *Palenque*, CANE *Parlamento*, June 2002),

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Education (IBE) is characterised by a critique of the Spanish model of education through the promotion of Andean notions and ancestral forms of thinking and learning (Rival 1996).

[152] One of the most important battles during Ecuador's independence war

that is why one of the most important parts of the proposal is to train their own teachers and develop their own texts.

> *"If we want to teach our history, we need to become the historians, until now history have been written by the others, the white and the mestizo"* (Angela Branda, *Palenque* Humedales, CANE *Parlamento*, June 2002).

This proposal they said needs to be built from their hearts and parents and teachers will play a very important role.

One of the important questions at the moment is how they are going to make this happen, as one of the old community leaders explained:

> *"We have been losing our culture since the Spanish invasion, so, we can not have an ethno-education system if we do not have identity. What are we going to teach if we ourselves do not know anything about our culture? First we need to rescue our traditions, for example how to make a cununo* (traditional conic drum), *a catanga* (traditional crab trap), *how to fish with a calandra* (traditional fixed long-line with hooks), *or how to make a marisquiada* (to fish during the night), *the outsiders will not teach that to our children, we need to do it in our homes"* (Fausto Chichan, CANE *Parlamento*, June 2002).

Aware of these issues the PCN is proposing as the best mechanism, the rescue of the oral traditions, black cosmovision, their custom and beliefs and their relationship with the dead (*difuntos*). Among some of the most important aspects to rescue are the social practices: the importance of the extended family for example, solidarity practices (*cambio de brazo*), and as one integrating component the rescue of the music and dance. Another very interesting aspect that the PCN is promoting is the rescue of the language and communication codes, among the ideas in this area is the proposal to designate Lingala[153] as the afro- language. Lingala is being chosen after research by Jean Kapenda (Congolese sociologist), found that several surnames from the Esmeraldas region originated in what is today the Democratic Republic of Congo and Angola (Kapenda 2001).

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[153] Lingala is one of the Bantu languages spoken throughout the North-western part of the Democratic Republic of the Congo, as well as to some degree in Angola and Central African Republic. It has over 10 million speakers.

All these ideas and proposals look very good and straightforward, but it is necessary to be cautious; even after they are approved, there will be still several hurdles to overcome. Among them it is necessary to make sure the State translates laws and regulations into real resources and mechanisms to make the proposals viable. Approval of proposals and legislation is not enough. The Colombian afro-education process offers a very good example. Since 1995 it has made very important legislative and legal advances[154], but these have not manifested themselves into the communities, or even at national level. The Ministry of Education has approved and developed the afro-Colombian studies curriculum, but has not yet implemented it. Additionally, the promised credit system for afro-Colombian students has only be granted a couple of times and was basically reduced to urban students (CIMARRON 2004).

Another important challenge refers to more internal issues; as mentioned before there is a undervaluation of the black element that has led to a culture of negation, so, for the ethno-education process to be successful this culture needs to be reverted, as this negative self-image favours what Tubino (2002) calls the self-disrespect that enhances the respect for the colonizer. Some of the leaders recognised that some teachers in their communities are not interested in teaching about the blacks, they do not want to know anything about the PCN, or the black heroes, and that is why they have identified the need to start the process by teaching the current teachers, so that they understand and learn and feel proud of being black; then they will be open to teaching this to their pupils.

Other leaders think that only black people will be interested, so they are asking for all the teachers in their communities to be black and local. The proposal intends to impose the rule inside the *palenques* that it will be an obligation for blacks to give his/her knowledge to their own community, and that trained black people have to come back to the communities to be the promoters of local development, this idea has not been well received by some of the young PCN activists:

> *"I don't think everybody agrees with that, it is very difficult to impose that type of rule, some of us want to go and work in Quito. For example, I am going to Quito because I have possibilities there, I have studied hard and I*

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[154] For example: in 1995 the special pedagogic commission for afro-Colombians was created; in 1996 the government approved a special education credit line for afro-Colombian students; in 1998 the Ministry of Education passed Decree 1122 which stated that all state educational establishments should include "Afro-Colombian Studies" as a subject in their curricula (DNP 2002).

don't think it is fair if they oblige me to stay here" (Willer Villota, interviewed November, 2002).

Another constraint the PCN recognizes is that in order to obtain a teacher post's for their communities they need to work with the government. The designation of teachers is done at a provincial level and there is no mechanism for the communities to have their say. What is important here is that the PCN takes advantage of the new rural school initiatives, which in theory give the possibility for the community and the communal organization to participate in the education process. Another constraint is that, to be a teacher you need to have a certain number of years of schooling and also a degree. Given the present schooling level in the coastal rural areas (for example in the REMACAM, chapter 4, section 4.5.2), it is less likely that a person from a rural area has that level of education. At the moment the designation of teachers is a very politicised affair. Because the designation is made in the provincial capital, it is normally people from that area that get the posts. Some people see this as: *"like a mafia, teachers get the posts and they stay in the urban areas, nobody wants to come to the rural area"* (Washington Cagua, Palenque Fedarprobim). So to be able to reach their objectives the PCN will need to engage with the political system, a system that in many ways they despise.

The requisites to access a teaching post are creating yet other contradictions in the PCN, on the one hand they criticize the type of education given in schools, colleges and universities but on the other they need their people to be educated so that they can access the posts. A very good illustration of this contradiction can be seen in the following statement by one of the PCN leaders:

> *"We send 8 young people from palenque Humedales with grants from PRODEPINE to study, they will come back and they will become the vehicle to teach everybody. To get excellent education we need to send every one of our young people to Quito and Esmeraldas universities. We cannot allow them to be without education, we need to live our reality and what we need is the CRP to commit to geting them appointed by the government"* (Angela Branda, Palenque Humedales, presentation CANE *parlamento* June 2002).

The contradictory position of the PCN with reference to education was even more apparent to me during the election of the directive board for the CANE first *parlamento.*

They needed to elect a *Bambero* (adviser), which as we said above (section 7.3.1.1), is part of PCN's effort to rescue traditional roles, so it should be given to an old trusted person from the community. So, one of the leaders proposed 'to honour the name of the *bambero'*, by appointing old people from the communities; but people in the assembly dismissed this idea and instead proposed that the position should be given to any member of the grassroots organization, who are studying to become lawyers. This proposal was accepted by everybody and the position was given to a young person, studying in Quito. This for me is a clear illustration of the contradictory position faced by the leadership; on one hand they are rescuing the ancestral organizations and respecting their local knowledge, a knowledge that they claim is contained in the sacred minds of the old people. But instead of having a "sacred mind" who can teach them about the old practices, they prefer to have a young person who is being educated at the university (universities that they said are classist and discriminatory). The same position can be observed in the community federations, where the *promotores*[155] need to be young, and have a high school degree, it does not matter that they do not have experience in defending or living in the mangroves, or if they do not belong to the local communities. These rules have created several problems with the local activists who have been defending the mangroves for years, and are not allowed to become *promotores* due to their lack of a "formal" degree.

All these tensions and contradictions should be seen as a result of the underlying structural problems, the asymmetrical relations that have led to the invisibilization, marginalisation, and exclusion of ethnic minorities in Ecuador and the rest of South America. Changes such as the ones proposed by the PCN are a very important step forward towards overcoming the inequalities in the country and for the construction of a citizenship without exclusions; however, we need to be aware that for things to change the underlying causes of poverty, marginalization and exclusion need to be re-addressed. It is important to remember all the basic indicators of quality of life (access to education, health services and other basic services, employment, life expectancy, etc.) for afro-Ecuadorian communities are very far below the national averages, so it will take more than an approval of a proposal to improve education and quality of life among the afro-Ecuadorian communities.

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[155] *Promotores* are people from the communities working with the mangrove project team. They are the liaison person between the team and the local communities.

These inequalities will also have an effect on the way the ethno-education process would develop. As analysed in chapter 4 (section 4.5) conditions of the schools in the REMACAM area are far from ideal, and as we explored above there are not enough black teachers or even afro-Ecuadorian texts. The development of the Intercultural Bilingual Education (IBE) in Ecuador and South America gives us a very good inkling as to what could be waiting ahead. After more than 20 years of legal approval, some authors argue that this education should be still considered as a proposal in construction (Lopèz& Sichra 2004) with many hurdles to overcome. In Ecuador for example, IBE is not yet an integral part of the country education system, and according to Lopéz and Sichra (2004) it constitutes a sort of para-system of the regular national education system. So we can see the afro-Ecuadorian ethno-education proposal as the beginning a very long and winding path.

7.3.2.3 Putting mangroves back into the heart of the people in the REMACAM

Conscious of the importance of formal education in changing the ways people relate to the mangroves, as part of their strategy to protect mangroves, FUNDECOL and now C-CONDEM has developed a social communitarian education programme to be implemented in all the Ecuadorian mangrove communities they work with (including REMACAM). In Muisne, the program has been administered through the FUNDECOL promoters and now includes life experiences of the different communities they work with. Through the program it is possible to understand the experiences of fishermen, cockle gatherers and the children in their fight to defend the mangroves.

The concrete reality, the experiences of the people is what determines what a pueblo is. The mangrove dwellers have another way of thinking, says Marianeli Torres (C-CONDEM member in charge of the education program).

"Look for example to what happened to me when I started to work in the mangrove communities. In a communitarian workshop I was explaining about the problem tree method so I asked a woman to draw a tree for me. She did, she drew a tree with outside roots and the fruit in the roots, a mangrove! In that moment I realized how different their way of thinking is. It is very different to climb a tree to collect oranges than kneel down (agacharse) to pick arc-cockles! That is why I do not want just to go the

communities to use methods developed by others" (interviewed November, 2002).

From examples such as the one above, the need to build new methodologies was born; methodologies to help in the creation of proposals based on the knowledge of men and women from the mangrove areas. For C-CONDEM the methodology is a continuous building process, where day to day experiences are incorporated into their work and in the way they approach the mangrove dwellers. As a result, C-CONDEM do not believe in the existence of one or two methodological models, there are "methodological processes" that are constantly rearticulated. "*Our methodology is a set of theoretical and conceptual elements, tools and techniques, but above all, the participation of the social processes subjects; they participate with their knowledge, their creativity, their expressiveness, reflexive and analytical capacity*" (Torres-Benavides& Fajardo-Yepez 2003, p.3). The authors believed that the methods gain value when they have a communal objective, when the community recognizes them, and makes them their own and when the community uses them, destroys them and rebuilds them.

Their program built on the legacy of Paulo Freire a popular education model which they called social communitarian education, how to create social and political subjects (see: Lopèz-Romero& Torres-Benavides 2004). The idea is to meet class-based needs and to strengthen the political voice; it is adult and young literacy which focuses on enhancing human capital as part of a wider social agenda, focusing on increasing community participation in the local development and mangrove defence. The objective is to re-affirm the mangrove community identity, not from the point of view of race, such as the case with the PCN discussed above, but from the point of view of identification and relationship with their natural resources. What C-CONDEM aims is to strengthen the citizenship of the mangrove communities and their relationship with the mangroves.

Teaching, workshops and all actions in defense of the mangrove and the life of the communities use the Freire's methodological trilogy, to SEE, to JUDGE, to ACT (Freire 1987). This trilogy has been re-elaborated by the C-CONDEM as: thought, heart and hands

- With the thought: "I know the mangroves and I recognize myself as part of them"

- With the heart: "I love my territory: the mangrove and I am part of it"
- With my hands: "I plant mangroves and I act for its defence and the defence of my life"

C-CONDEM uses four basic elements in their work, a short field research on customs and traditions, where together with the communities they reconstruct the history of communities origins, with simple questions where do I come from, who am I and where am I going to? After the recuperation of community history they move to a re-affirmation of the sense of belonging and re-valuation of the cultural practices. Then community groups move to a theoretical discussion of the local, traditional practices, using the thoughts: why we are like this, why we do things in the way we do? The last element is the community inter-changes, C-CONDEM take groups from some communities to others, and they visit each other. Through these visits community groups do not only get into contact but also interchange ideas, problems and find solutions. During my field work I was part of some of these visits, one included a group from different coastal areas of Colombia. During the visit (one week) we visited communities from REMACAM and Muisne, and it was really interesting to see how the Colombia group was shocked when they saw the devastation caused by the shrimp farming industry in the Muisne area. For them it was a revelation, especially for the people from the Colombian North Pacific coast where shrimp farming has not developed yet.

The end result of this methodological process is to create a symbol, and to make mangroves that symbol, to make mangroves central to their day to day lives and to their cultural expressions. Through the process mangroves recover their position in the communities; they go back into the heart of the people. According to C-CONDEM conservation of the natural resources only make sense for the people who live with them, the people who feel they are one with the resource and that they belong to it. When people understand the value these resources have in their construction of life and the dreams of the local communities, it is when they mobilize and fight (FUNDECOL 2003a, p.7).

As part of the implementation of C-CONDEM social communitarian education programme in the REMACAM communities, C-CONDEM and the mangrove project devised a year's course for 25 people, in which I actively participated (see chapter 3). The idea is that these students are the first seeds, and then they will become the multipliers in

their communities. Among the students we had the young promoters working for the mangrove project and representatives from the majority of the mangrove communities. As part of the course the promoters were asked to go to their community school and to talk about mangroves, cockle gathering and fishing, to see what the reaction from teachers and pupils was.

What was really fascinating was the refusal of the community school teachers to allow our students to talk about mangroves or to do so themselves. In the majority of the cases the teachers refused, arguing that it was not part of their curriculum. The exercise was only possible in one school (Tambillo), where the teachers were part of our course. There, the teachers managed to include mangrove information in the curriculum, at the end of the year the children themselves organized a pantomime for the whole school, and the community in general, to show them how important the mangroves are. The pupils loved it; it was a revelation for them, as Alfredo Ortiz (teacher Tambillo School) told me:

> *"Every time I arrived to the school after one of your workshops my pupils ask me what I have learned, they love listening to all the things I tell them about the mangroves and the animals. I take all the materials with me and share it with them, they all loved it. Iit was their idea to do this pantomime they wanted to show everybody how important the mangroves are"* (Interview January 15, 2003).

After refusal from their community school teacher, another two of our students decided to get all the children from their small community together after school, during the high tide. They told them about the mangroves as a game; they taught them how important the mangroves are for their communities and for the animals. They also taught them about the problems with the small arc cockles that people are gathering and how this will decrease the production of cockles in the area; the children loved the "high tide talks" and started taking the small cockles collected by their parents which were normally left in the roofs to die back to the mangroves.

These two examples show how easy it would be to introduce local information into the schools. One of the most important elements is that the teachers learn about it, in that way they have the elements to teach. Based on these examples and with the idea of integrating the school teachers in the mangrove defence, the mangrove project has started

talks with the school headmasters and teachers from the REMACAM to initiate an environmental education campaign, which will use the materials (*cartillas*) produced by C-CONDEM and the mangrove project. In these materials the communities are reflected and used as examples with the main role played by a mangrove child. Teachers in the rural mangrove communities can play a very important role in putting the mangroves back into the heart of the people. As Laura Rival argues in relation to her work in the Amazonas, "rural schools could become important sites to imagine and create alternatives, and think inclusive definitions of humanity, in particular relationships to the environment and to non-human species" (Rival 2005).

For me, the most interesting finding was that even though the majority of the leaders from the Federations (FEDARPOM and FEDARPROBIM) are teachers, they did not allow our students to talk about mangroves in their classes. This is very surprising because as leaders of the federations they are the representatives of the mangrove communities and also of the PCN, and, as we discussed before at their meetings they were critical of the formal education system. So their refusal to allow our students (with whom they worked together on other activities) to teach about mangroves, took us aback. Are they just paying lip service to the education discourse when they are supposed to be part of the mangrove defence process, so why this refusal? Talking to them we found out one of the reasons they did not allow our students to do this was because this was not authorised by the PCN: *"These type of ideas should come from the "dirigencia" (maximum leadership) and not from the people who are just starting their path in the process"*, the President FEDARPROBIM told me, *"we are the ones that are in charge, we know what are the best things to do"* (Euquerio Segura, interviewed January, 2003).

This example shows some of the tensions between the C-CONDEM and the PCN The problem some believe is the structureof the PCN which is too vertical.

> *"They do not allow anything that does not come from the dirigencia, we the young, the new generation are not allowed to have ideas, that is why I prefer to work with the C-CONDEM and the mangrove project"* (Maximo Canga, mangrove project promoter, Interview January, 2003).

These tensions should be seen as the result of outsider perspective permeating into members of the communities through the formal education system. We need to understand

that even though the federation leaders support the mangrove struggle they are the result of a de-contextualised education system where the importance of mangroves and natural resources is not taught or seen as significant. Also as teachers they are following government rules on curricula and teaching contents. These tensions should analysed as the result of a long process of cultural imposition and invisibilization, and the only way to overcome them is to establish a dialog between the PCN and the C-CONDEM, even though they are focusing on different aspects of what the want at the end of the day is to improve the livelihoods of the mangrove communities, and the mangroves are a very important part of that livelihood.

7.3.3 C-CONDEM and the custodial process

From the start the mangrove defence movement has recognized the need to recover the mangrove areas invaded by the shrimp farming industry. They believed that these areas legitimately belong to the traditional communities, and that their invasion by the shrimp farming industry is a consequence of the ill defined property rights and the open access regime in the mangrove areas. So, in their strategy to recover the insider view of mangrove management they proposed to give these areas back to the communities. They have also argued that the remaining healthy mangrove areas need to be given over to the traditional mangrove communities for their own use and conservation. In 1991 FUNDECOL formally requested that the INEFAN[156] give the mangroves in the Muisne area to the communities under a type of concession or leasing arrangement. This proposal was systematically rejected by the State authorities who argued that mangrove areas were by law, a national forestry patrimony of the state. What is ironic is that at the same time the same authorities were giving concessions to the shrimp farmers for as little as $10US dollar per ha per year (as explained in chapter 6, section 6.4.3).

As a result of this situation, several local and national protests, public mobilizations, accusations on the radio and television and the siege of the INEFAN headquarters were carried out continuously for more than 5 years, until in 1996 the INEFAN was pressurised into signing the first agreement with FUNDECOL. Although this agreement did not give the mangrove areas over in custody to the communities, it did recognize FUNDECOL as authorized to manage the mangrove ecosystem. This agreement gave FUNDECOL more strength to rehabilitate, guard and monitor the estuary area and to replant mangroves. The

[156] INEFAN later became part of the Ministry of Environment

same year, and again responding to pressure by the mangrove defence movement, the Ecuadorian government granted the status of ecological reserve to what is today the REMACAM.

> *"This shows how struggles in Ecuador are won; sending letters to the government does not really work. We need to protest, to mobilise, to get international help, otherwise the government does not care about us and our demands"* (Lider Gongora, executive secretary C-CONDEM, interviewed, July 2003).

In 1999, under the new national legislation that gave collective territorial rights to ethnic minorities, FUNDECOL presented a new proposal to the Minister of the Environment (Dr. Y. Kakabatse) for the community administration of mangrove areas. This proposal (as were all previous ones) was denied. But again, at the same time the government included the article 164 in the famous *Ley Trolle Dos* (see chapter 6, section 6.4.4). The article, as we know was proposed by the shrimp farmers, and its objective was to allow the shrimp ponds built in destroyed mangroves areas on public lands over the previous five years, to become legal private property. Here we can see a very good illustration of the political consequences of the struggles over representations we analysed in chapter 4. The shrimp farmers only needed to sit and talk to the government, whilst the mangrove communities needed to struggle for years to be heard. So it is easy to understand how the outsider perception of mangroves has gained a footing in government legislation.

After article 164 was dropped from the law, thanks to the massive national and international mobilization organised by the mangrove defence movement, a new Executive Decree was signed by the president Jamil Mahuad, Executive decree 1102 (O.R. 243, see: CNE 1999a). The decree was the result of a proposal presented by the mangrove defence movement during the "give our mangrove back to us campaign" (see chapter 6, section 2.3.4). It included the movement's petition to maintain the prohibition to cut and exploit mangroves and for the first time opened the possibility for the traditional communities to get control of mangrove areas, through the agreement for the sustainable use and custody of mangroves.

> *"Although the decree did not include the petition that custodial areas were given for 99 years, it is a very important step to initiate a communitarian*

participation process based on the defence of territorial and environmental rights" (Marianeli Torres, C-CONDEM interviewed November 2003).

The approval of the decree again shows us the reactive position of the government in relation to mangrove legislation; it was only after massive national and international pressure that the decree was finally approved. Also it shows the government's outsider negative perception that maybe communities are not the best agents to look after the mangrove areas. The *custodias* will initially be given to the communities for ten years, and after an inspection by the MoE, they can be extended for another 90 years, if the community have looked after their mangrove area properly. In contrast, the mangrove areas were going to be given to the shrimp farmers for 99 years without any monitoring from the MoE. Maybe the government was aware that the areas were going to be destroyed so there was no point in revising them after 10 years!

7.3.3.1 How the custodia will function

The general idea of the custodial agreement is that mangrove areas are allocated to traditional communities for their use and management. The uses approved in the custodial areas are only traditional uses and practices such as fishing, cockle gathering, and crab gathering. Also, local communities are allowed to cut mangroves for their personal or communitarian use. Industrial practices like charcoal production or mangrove wood exploitation are totally forbidden. However actions such as cockle and crab ranching and re-stocking are allowed. What is very important is that gathering practices are permitted only to local traditional gatherers of each community. *Custodias* are the best illustration of how the binaries we discussed in chapter 6, are shaping the way mangroves are used and protected. Through the *custodia* the ecosystem is symbolically given back to the traditional users, and becomes again everybody's land. The fact that only traditional uses are allowed inside the custodial area reinforces the view of mangroves as home and multiple resource provider, and somehow that industrial uses are external to the traditional communities. This is a clear illustration of how the traditional communities are described by what they are not, the non-commercial, the non-modern (see chapter 6, section 6.2.4).

The custodial agreement will be signed between the MoE (as government representative) and a legally recognised group[157] which will be the community representative. The groups could be associations, community groups and cooperatives, but the need to show they have previous experience in managing not only mangrove but resources such as cockles and fish, and also they need to show they have the support from a public or private institution. This support is shown through the signature of a technical assistance agreement between the community group and the institution.

The other requisites for obtaining the custodies are the presentation of a management plan, an environmental impact assessment, and a geo-reference map of the custodial area. Areas eligible for custody are the areas that have customarily belonged to the community and have been used traditionally for mangrove wood collection or for cockle gathering. A very important aspect is that traditionally fishing grounds have not been part of the custody area, as water systems are not part of the reserve. As we analysed in chapter 5, the use and allocation of mangrove resources is divided along gender lines, men fish, women gather cockles. So, the role of women has become pivotal in the custody process, not only because traditional cockle gathering grounds are one of the most important elements showing that the community have used the area, but also because cockle gathering has traditionally be carried out in groups (see chapter 5, section 5.5.2.6). It was very easy for female cockle gatherers to organize into legal associations; additionally several of the female cockle gatherer groups have first hand experience in fighting in the mangrove defence movement, so it is been logical for them to assume the leadership in the custodial process.

What is important to understand here is that requisites to obtain the custodies were devised by the MoE.

> *"We gave them our proposal and after pressure they accepted it, but you know the government, they needed to make sure the process was long and complicated, and also they made sure to put lots of obstacles in our path. They told us they needed to put in place a set of rules, a reglamento, and they did!"* (Lider Gongora, interviewed July 2003).

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[157] These groups are the same grassroots or base organization discussed in section 3.1.1. The need to hold a *personeria juridica*, which shows they have a proper directive board and hold an assembly at least one a year.

The set of requisites devised by the MoE shows us again the government's outsider views of the communities, and of the management of natural resources, it is only through the use of sophisticated management tools that the ecosystems can be managed; again we see how the outsider vision shaped every single initiative to use and manage the mangroves.

What is very interesting is the communities response, some of them got together with NGOs, universities and other institutions to make themselves to comply with the MoE requirements. Table 7.5 shows the number of national concessions obtained until 2004. From this table it is very easy to note that the majority of custodies have been obtained in the Esmeraldas province, specifically in the REMACAM area, where 70% of the custodial areas are held (see below section). This according to Lider Gongora is the result of the requirements imposed by the MoE.

> *"The government does not understand that the coastal communities are very poor, we do not have the capacity to make management plans or to pay a professional to do it, and neither do we have a GIS system to produce a geo-reference map. Not all communities have the luck to have a rich mangrove project such as the one in the REMACAM. Look for example at the Oro province, concessions there are very, very low"* (interviewed July 2003).

Table 7.5 Concessions given to Coastal Communities at national level

Province	**Canton**	**No. custodies**	**ha given in custody**	**Percentage**
Esmeraldas	San Lorenzo	7	7,499.5	40.1
	Eloy Alfaro	5	5,558.3	29.9
Guayas	Guayaquil	1	3,394	18.3
	Naranjal	1	1,366	7.35
	Sta. Elena	1	36.9	0.19
El Oro	Pto. Bolivar	3	213.7	0.81
	Sta. Rosa	5	728.3	3.05
Total		19	18,796.7	100

Source: adapted from FEPP-Manglares and C-CONDEM information.

Even though the movement is frustrated they still think *custodias* is the way forward and they are trying to find other ways to be compliant with the MoE requisites,

"We are in talks with the Ministry, we want them to accept communitarian maps, they will be done based on topographic charts produced by CLIRSEN, but all the details will be done with the help from the community. Also we are working very hard in the communities to help them to produce their own management plans, we have our technicians working with the communities. We have already made the MoE accept the Muisne communitarian plan, there is still a long way to go, but we keep fighting" (Marianeli Torres, C-CONDEM, interview, July 2003).

This new battle is again a clear illustration of another set of binary oppositions, formal knowledge vs. local knowledge, but again the C-CONDEM is trying to adapt, using technicians and some formal tools and converting them into something more accessible for the local communities.

7.3.3.2 The mangrove project and the REMACAM custodies

As part of the REMACAM's creation, the mangrove project was approved by the government; the project was conceived by the community members, fishermen and women cockle gatherers' associations, and is executed by a national NGO (*Fondo Ecuatoriano Popularum Progressio*–FEPP) with financial support from the Dutch Embassy. The main objective of the project is to help the mangrove communities with the communitarian management and sustainable use of mangrove resources in the reserve, and to improve the communities' quality of life and their opportunities for development (FEPP-Manglares 1998).

Among the project activities has been the provision of expertise and money to make the geo-corrected maps and management plans for the reserve mangrove communities. Also with help from FEDARPOM and FEDARPROBIM they organized and helped grassroots groups to obtain the legal status so they can ask for custodial areas.

"It has been really hard, the government does not realize that people in the rural communities do not even have a national identity card, and to be able to obtain a personeria juridica all members of the group need an identity card, so we have been helping the people to get them" (Winter Vera, mangrove project technician, interview November 2002).

The project has been very successful in obtaining custodial areas; table 3.2.2 show the custodies obtained up to 2004.

Table 7.6 Custodial areas obtained by the REMACAM communities up to 2004.

Community Name	**ha of Mangroves**	**Date**
Campanita	522	18/12/02
Canchimalero	362	18/12/02
El Bajito	877	18/12/02
El Viento	1,207	14/04/00
Guachal	1,022.9	18/12/02
La Barca	785	14/04/00
Olmedo	385.2	7/11/01
Palma Real	1,057	8/08/00
Pampanal	2,953	14/12/02
San Antonio	195,7	8/08/00
Santa Rosa	1,114.4	14/04/00
Tambillo	2,576.6	14/04/00
Total	**13,057.8**	

Source: adapted from mangrove project information

The success of this stewardship program can be seen in the slowdown of mangrove cutting. Since its beginnings, it is calculated that 98% of illegal mangrove cutting has been stopped (Lemos 2002). Another important aspect is the strengthening of the local mangrove defence groups and the creation of organized groups in other communities. Some of them are now formally requesting custodial areas from the government.

The reserve and custodial figure has now been replicated in the south of the province. As we saw in chapter 6, section 4.4, the government granted status of *refugio de vida silvestre* (wildlife refuge) to 3,200 ha of mangroves in the Muisne area (FUNDECOL 2003c). The declaration also included the signing of an administration, use, management and custodial agreement; under the terms of the agreement the traditional communities will have technical support from FUNDECOL. According to C-CONDEM the success of the REMACAM custodies has encouraged communities along the coast to ask for their own custodies,

"We are receiving more and more letters from some of our members, community groups have heard about the REMACAM custodies and now they want our help in presenting custodial proposals to the MoE, we are very encouraged. REMACAM has always been our symbol against the shrimp farming industry" (Veronica Yépes, C-CONDEM, interviewed November, 2002).

The process has been widely publicised by the C-CONDEM through national and international meetings. Other countries such as Mexico and Honduras are also trying to implement similar ideas. Also, the REMACAM *custodias* resemble the extractive reserves used since 1990 to co-manage natural resources in Brazil and are being used to manage some mangrove areas in the north coast of the country (see: Glaser& Oliveira 2004).

7.3.3.3 Opening other collaborative spaces

The mangrove project and the custodial rights have opened the space to initiate other co-management processes; among them is the monitoring of the cockle fishery. As shown in chapter 5, section 5.6, the cockle fishery is showing deterioration. Since 2001 the mangrove project and cockle gatherers groups have initiated a monitoring process to establish what is happening with the resource. Preliminary analysis of the data shows that the size of cockles harvested is diminishing and also that their abundance is decreasing (FEPP/INP 2002). These findings have led to talks of starting a ban; different from the ban imposed every year by the MoE, this ban is called a self imposed ban; the idea is that cockle gatherers in the area will not collect cockles smaller than 45 mm. and if they are collected they will be returned to the mangroves,

"here is when we need to work together with the local communities, to change some of the local practices, for example not to collect small cockles or to leave them to rot at the top of the houses" (Edgar Lemos, mangrove project director, interview November 2002, see also chapter 6, section 6.2.4)

There are now talks with the MoE office to look into the possibility of replacing the normal ban system with this new communitarian self-ban. This, and other strategies have now been coordinated through the Local Mangrove committee[158]. The committee was created in 2001 and has representatives from the community groups, the MoE, the

[158] This committee is one of the committees describe in section 7.2.2.2.

mangrove project and the port captain[159]. One of the most important functions of the committee is the prompt identification and solution of illegal activities such as mangrove clearing, charcoal production or commercial cutting, this fact is facilitated by the representation of all the institutions, local organizations and grassroots groups dealing with mangrove issues in the reserve.

7.3.4 The mangrove conservation law

As analysed in chapter 6, section 6.4.4, in 2001 C-CONDEM presented the mangrove conservation law (MCL) to the government. This is the first communitarian law prepared in the country and was presented to the congress using the space opened by the Special Decentralization and Social Participation Law approved in 1997. The MCL took 3 years to prepare. It was developed by C-CONDEM with the participation of grassroots and organizations from across the whole country. This law is an attempt to end the contradictory and complex legislative framework devised by the government's outsider perspective and include the traditional communities and their insider perspective in the management and conservation of their mangrove ecosystems. "This law constitutes the work of hundreds of male and female comrades who for decades have tried to build new paths in the practice of our citizen rights" (FUNDECOL 2003b, p.1).

Among the departure points for the law is the creation of a unique legal body that legislates in all aspects of mangroves and also, for the first time, to give a proper legal definition of what constitutes the mangrove ecosystem. The aim of the law is to permanently halt the destruction of the mangrove ecosystem, to include citizen and communitarian participation in the management and administration of the ecosystem and to protect the lives and economies of the coastal communities whose livelihoods depend on the mangrove ecosystem (C-CONDEM 2003).

Throughout the law it is possible to recognize how C-CONDEM uses the communitarian/environmental narratives discussed in chapter 6. For example, it established with scientific precision all species of flora and fauna associated with the ecosystem, and at the same time presents the mangrove as a cultural reference point for traditional communities presenting the vision and legends associated with them. It also uses the political constitution as the basis for their claims for a clean and balanced

[159] Port captain is in charge of the maritime security in the country, being the REMACAM a border area its functions become more important, that is the reason they are part of the committee.

environment that warrants sustainable development. The law is very clever in political terms as it proposes the creation of a National Inter-institutional Committee for the administration, management, protection and conservation of mangroves. The committee will have representatives of the MoE, MoD, the ministry of external trade, the president of C-CONDEM and the CEDENMA president. In this way civil society will have a fair representation and the government will not feel threatened by the law. The law also established a clear system of fines based on the government system and scales. It also stipulates a budgetary mechanism to implement the law.

> *"We have to make sure that all our articles and proposals are according to the State framework, that none of our articles clash with the existing laws and/or codes, we do not want to give them an excuse to drop the law"* (Ramiro Roman, C-CONDEM senior lawyer, coordinator of the law, interview November, 2003).

The law was presented during the 2001 mangrove campaign "justice for the mangroves". In 2002 the law was discussed and approved in the first debate[160] and has been presented twice for its second debate, several of the articles have already been approved (C-CONDEM 2005). Currently, the congress commission in charge of presenting the law is threatening to send it back to first debate. They argue that local mayors were not consulted in the preparation of the law and that under the new decentralization regime they should be part of the process. This is obviously a government subterfuge in its aim to stop the law. As Lider Gongora put it to them "if you continue delaying the approval of the law, we will not have any more mangroves to protect, you (the congress) have a historical responsibility, the approval of the law is the only way mangrove ecosystems and the lives and livelihoods of traditional communities will be saved" (C-CONDEM 2005, p.1).

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[160] In Ecuador new laws presented to the congress for first debate, if approved it will be presented again in a second debate. If Congress asks for changes or clarifications the law can be presented several times in the second debate until it is dropped or approved.

Chapter 8 - Conclusions

8.1 Introduction

This thesis set out to explore the complexities of social, political, and economic changes that arise from the introduction of neo-liberal industries and reforms in developing countries by examining nature-society interactions through an engagement with discursive political ecology and the use and politicisation of local knowledge in the defence and management of mangrove ecosystems in Ecuador. I have sought to bring historical, ecological, political and theoretical perspectives into these complexities in order to present an interdisciplinary approach to the subject. In this process, I have examined different scales. From the macroeconomic policies and forces that have made possible the development and expansion of the shrimp farming industry and the growth of an international movement against it, to the micro impacts that the introduction of the industry and neo-liberal reforms are having in the study area and the local reactions to and engagements with those impacts.

Using environmental discourses and narratives as an analytical tool, I have also attempted to examine how the way in which natural resources (such as mangroves) are perceived has a very important effect on the way they are used and managed. I have shown how the economic and cultural importance of mangrove ecosystems for local communities has created a specific cultural representation of the ecosystem; an insider representation that contrasts with that of the people outside the ecosystem. The outsider perception on the other hand, can be traced to the arrival of the Spanish conquistadors and can also be observed in the current Ecuadorian laws and legislations. As the insider view is being successfully used by the mangrove defence movement to oppose the present legislation and develop new management strategies, the outsider perspective has had a direct impact on mangrove depletion in Ecuador. This is the first time such an approach is used to understand the roots of natural resource depletion and the role of local communities in natural resource defence and management.

This research offers a multidimensional analysis of the mangrove/shrimp farming struggle. It also shows how integrating local communities into the management of their own resources enables the implementation and development of innovative management

practices and viable mechanisms for the sustainable use and management of natural resources and the livelihoods that depend upon them.

In this final chapter I provide a review of the key elements presented and analysed throughout the thesis and a summary of the central arguments made.

8.2 Extracting protein from the poor

Virtually all of the world's farmed shrimp is produced in the global south, but gets eaten in the developed countries. The USA, Europe and Japan are the major shrimp importing markets, with the USA alone consuming 40% of the word's shrimp production. Also because the industry is heavily dependent on formulated feed based on fish meal and fish oils, it uses twice as much protein than is ultimately harvested, so currently the industry is a net consumer of aquatic products rather that a net producer. Additionally if the habitat loss for local fish populations is taken into account, we can conclude that what the shrimp farming industry is doing is extracting low value protein from poor local communities to convert it into luxury protein for the developed world. In this process the industry is destroying coastal environments and the livelihoods associated with them, privatizing common resources and marginalizing local communities. From research results in areas where the industry has developed and evidence from this research in particular, it is possible to see how the number of jobs provided by the industry are very limited, contrasting with the high numbers of subsistence and economic resources provided by the mangrove ecosystem.

8.3 International aid and financing to destroy local livelihoods

The shrimp farming industry developed and expanded virtually un-challenged for a couple of decades fuelled by demand from developed countries and fostered by the financial and policy assistance of the International Finance Institutions (IFI). Through loans and direct financial aid, the imposition of macroeconomic policies on debt stricken developing countries, technical assistance and the promotion of private sector investment, the IFIs have and still are promoting uncritically the development and expansion of the shrimp farming industry in the developing world.

Although the IFI (represented by the WB, FAO and NACA) have recognised the strong interest globally in shrimp farming and the issues that have arisen from its development, and have created a consortium to analyze the interactions between the

industry and the environment, there is still little recognition of the negative social effects of the industry. There is no global assessment of the effects of shrimp farming on water use and pollution, the destruction of traditional fishing and gathering grounds, the improper use of antibiotics, drugs and chemicals and introduction of pathogen and parasites into surrounding fisheries. All of these have a direct effect on the local communities that depend on local fisheries for their livelihoods. There is also little (if no) recognition of the effects of the industry on local food security, the control and use of local natural common resources such as land, water, seed and feed and the marginalization of traditional communities. Local voices denouncing violence and conflict and the destruction of livelihoods in the areas where the industry has developed have been ignored, discounted as anecdotal evidence or presented as examples of exceptional circumstances that do not reflect the larger reality. Even though the industry and the IFIs have adopted a sustainable rhetoric, this rhetoric however does not go farther than the design and publication of voluntary Codes of Conduct and Best Practice Management regimes with no external mechanism for evaluation and/or verification. All in all the industry and the IFIs are still in denial about the real social and environmental effects of the industry. This denial has led to little change in the way new shrimp farming projects are designed and implemented in other developing countries.

8.4 Masking social and environmental consequences: the role of aquaculture research

The pivotal role played by aquaculture research funded by the IFIs in the promotion, development and expansion of the shrimp farming industry (as highlighted in chapter 2) has barely been analysed by academics or environmental activists fighting the industry. By targeting specific export-orientated aquaculture research initiatives and focusing on technical and economic aspects of the industry, IFI funded aquaculture research not only promoted the development and expansion of shrimp farming but also allowed the industry's environmental and social impacts to go un-detected and unchallenged. It also ignored and marginalised research into other aquaculture systems which could benefit the local communities. Systems which are less capital intensive, but more efficient in producing protein to meet the local population's requirements and that could be more sustainable in the long run have been sidelined by IFI focus on expanding commercial shrimp farming.

8.5 Transcending localities to resist the shrimp farming industry

The loss and degradation of communal resources, upon which local livelihoods depend and the salinization of agricultural land and fresh water sources caused by the development and expansion of the shrimp farming industry has triggered a grassroots resistance movement that has been able to transcend their localities to become a global resistance movement. The movement works through extensive networks and is supported by international environmental NGOs, human rights groups, private foundations, researchers and scholars. This extensive network has been made possible by the use of the internet, e-mail systems and distribution lists. Although there have been problems among some of the members, there is still a coordinated international coalition targeting consumers in developed countries and tapping into global discourses of sustainability, human rights and poverty alleviation. The Ecuadorian mangrove defence movement is one of the founders and active member of one of such movements (Red Manglar). Through international alliances Ecuador's mangrove defence movement has found not only financial help for its functioning, but a platform to take the mangrove plight to the national and international arena. This shows how the local concerns and the insider perspective of the mangrove communities in the study area have transcended their local geographical scale and are now part of the global resistance movement against the shrimp farming industry. Key to this movement has been promoting recognition for local knowledge in sustainable management of natural resources.

8.6 Creating and changing environmental discourses and local knowledges: living among the mangroves

Mangrove dwellers in the study area have a different way of interpreting their world, with the moon, low tides and high tides playing a very important role. They have adapted their life style and work practices to mangrove conditions, especially to the tidal patterns. Tidal conditions in the area have created a specific time management governed by the tidal rhythm and the moon. Tides dictates when mangrove dwellers go cockling, or fishing, during *pujas* (every other week) cockle gathering is done during the morning whilst during *quiebra* it is done in the afternoon. A lack of understanding of this specific working pattern, by programs and project workers, (which follow the western working calendar -9 to 5, Monday to Friday), creates tensions and makes interaction with the communities difficult. To improve interaction with mangrove communities, external visitors need to better understand local time management and adapt their working practices to it. The

cockling calendar (chapter 4) created with the local communities provides important data for achieving this.

Contrary to perceptions among some researchers, technicians and development workers, I found that local communities have an ample perception of mangrove functions and services; they clearly understand the role of mangroves in supporting fisheries: fish, shrimps and cockles and other molluscs. Local people fully appreciate the important role played by mangroves in their local economies. For them mangroves are the source of all life and the most important source of work, and protein.

Also, they have the ability to recognize subtle differences within the mangrove species in the area, showing that they possess a very specific mangrove botanical knowledge. They can distinguish some of the most abstract mangrove functions such as oxygen producer and recycler. On the other hand, it was possible to identify knowledge changes and loss in relation to mangrove direct uses and the artisanal fishery; these changes are the result of the introduction of new materials and fishing practices in the area. These results show two very important aspects, first that local community's knowledge is not limited to the extraction practices as stated by some authors, and second that their knowledge is not fixed, it is dynamic and changing. For example, the identification of mangrove abstract functions is likely to be part of the environmental narratives that have trickled down to the local communities from the environmentalist discourse. And loss and changes in knowledge about the mangroves and the fisheries are due to external materials and practices entering the communities. This shows that the REMACAM communities are not isolated anymore. Communities create new environmental discourses and knowledges through local practices and the interaction with external groups. For example in their struggle against the shrimp farming industry local communities have included new environmental narratives into their discourses.

It is very important to recognize that in the daily interactions with the ecosystem and external factors, people are creating new environmental discourses and knowledges and changing existing ones. These knowledges and discourses have continuities with the past and the locality that are very important for the sustainable use of mangroves today. New knowledges and environmental narratives need to be acknowledged, respected and incorporated more centrally into the PCN discourse. Maybe they are not part of the

ancestral mandates or inherited from African traditions, but they show local communities' adaptation to the mangrove specific environment and as such can provide the building blocks in the construction of new traditions, the (re)construction of their identity and their rights to difference.

8.7 Mangroves the centre of the local livelihood strategies in the REMACAM

The extraction of natural resources from the mangroves (fishing and/or cockle gathering) is seen as the most important use of mangroves in the area, 67.7% of the households either fish or cockle gather, 10% gather cockles and 8.3% fish. Even though there are more than 3,000 ha of shrimp farms in the area, they only provide employment for 0.6% of the households. Mangroves are also used as direct sources of wood and firewood, although only at a subsistence level. 77% of the population are using mangrove wood for house building whereas less than 15% use mangrove as firewood source. Charcoal production is minimal with only one household reporting selling charcoal as economic activity.

The most important economic conclusion to be drawn from the data is that the household income in REMACAM stems from multiple sources, some communities depend on agriculture complementing their economy with fishing and cockle gathering, while some others have a stronger dependency on fishing or cockle gathering. Therefore changes in one of the economic activities will not only affect the total income into the household, but will also affect the importance of remaining sources and some external impacts and changes in resource allocation can affect some communities more than others.

8.8 Shrimp farming in the REMACAM: destroying local practices and livelihoods

The development of the shrimp farming industry in the REMACAM has led to the destruction of gathering grounds, exclusion of traditional cockle gatherers from several estuaries and small creeks and the displacement of local people from other traditional economic activities such as agriculture. Local people also reported several cases of massive fish and crab mortality, all of which according to them were related to shrimp pond discharges. In the communities more affected by the shrimp farming industry (Pampanal and Tambillo) the number of cockle gatherers has increased in the last two years, as displaced fishermen are taking up cockle gathering. The increased pressure on

cockles can be observed in the fact that more than 60% of the cockles collected in some communities are under the recommended minimum collection size. These problems are exacerbated by the appearance of new itinerant cockle gatherers, young men displaced from their traditional logging jobs due to the rapid development of African-palm plantations in the rainforest area; they use outboard motors and claim open-access to the cockle resources. So, the cockle fishery is absorbing the surplus labour from elsewhere in the economy and this is leading to its further deterioration. A decrease in the cockle fishery would certainly weaken its poverty alleviation and food security function, affecting the most vulnerable groups in the area: female headed households and the old people. Also the changes in the traditional cockle gathering practices will lead to a loss in knowledge transmission and the loss of the cultural and social aspects to the fishery that have until now made possible its sustainable use and management.

8.9 Managing mangroves from outside: the government laws and regulations

It is possible to observe a dichotomy in the way mangroves are perceived in Ecuador today and the roots of these perceptions can be traced to the arrival of the Spanish conquistadors to Latin America. The outsider perceptions that see mangroves as mosquito ridden wastelands made it possible that the shrimp farming industry developed and expanded in the country at the expense of the mangrove ecosystem. Governmental mangrove management in the country is a clear illustration of this outsider view. Mangrove legislation is disparate, falling between different ministries and government agencies with little understanding of mangrove natural complexity. The low value of mangroves in the eyes of the government is reflected in the reactivity of mangrove regulation, and the apathy to implement it (once approved). Here we can see how an outsider system of arguments and interpretations have shaped policy, regulations and practices affecting the way mangroves have been used and abused in Ecuador.

Laws have been approved without workable implementation, guidance, real monitoring and/or corrective mechanisms. For example, the supreme decree 2939-B from 1978 forbids the construction of shrimp farms in the mangrove areas, but does not impose sanctions or fines to the transgressors. Through the government regulation is also possible to see the total disregard of local and traditional communities that have depended on the mangrove ecosystem for their livelihoods for a long time. After mangrove damage was

revealed (in 1985), the government tried to impose strict regulation focused on conservation, centralized enforcement and prohibition of all uses. This regulations gave no provision to accommodate traditional communities and again without establishing real implementing mechanisms. Failings in the legal framework were exploited by the shrimp farmers, concessions were easily obtained, communities displaced and mangroves destroyed.

With this type of regulation the government converted a common property regime into an open access regime, so the actions to protect mangroves in reality made them more vulnerable to encroachment. The mangroves open to all for hundreds of years became walled and compartmentalised, the local communities were evicted, cockle, crab and fishing grounds converted in shrimp farms to produce delicacies for the rich in the north and to benefit the wealthier segments of the Ecuadorian society and foreign investors.

8.10 C-CONDEM: giving voice to the insiders and becoming a development actor

The insider perspective, that sees mangroves as a multiple use ecosystem and a provider, has been successfully used by C-CONDEM to create a strong movement against the shrimp farming industry. In this process they have created a new political space of resistance, which includes challenging, and changing national legislation, and proposing new legislation and management strategies to defend the mangroves and the traditional communities whose livelihoods depend on the ecosystem. C-CONDEM has also been successful in taking the mangrove insider view to the national and international arena and has become an authoritative political actor in relation to environmental management in Ecuador. They have translated the social capital accumulated in their struggle against the shrimp farming industry into a form of political capital and through this process they are giving a voice to the poor coastal communities. The mangrove defence movement is in fact becoming a new development actor in the country.

This role is partly evidenced by the way in which the C-CONDEM is helping shift understandings of mangroves. C-CONDEM's work and its national and international alliances have created a new communitarian/environmental construction of mangroves, with mixed elements of the insider and outsider perspectives, blurring the binaries about mangrove representation and construction. The REMACAM's creation and sui-generis functioning is the result of the new social construction of mangroves. Environmental

status was granted because of its environmental importance, but also because it was seen as a livelihood base for the traditional-local communities. As a result, in contrast to other natural reserves in the country, the traditional communities were allowed to stay, and are now in charge of its protection and rehabilitation. This is a very good example of how the subaltern voices are reframing the environmental discourse, contesting and creating new laws and at the same time proposing new hybrid spaces of conservation where the mangrove ecosystem and the communities that depend on them have a better chance to survive.

8.11 Leaving the people behind: the case of environmental decentralization in Ecuador

In the past decade the Ecuadorian State has been profoundly transformed to create the legal framework to enable local participation and decentralization reforms. To be able to proceed with environmental decentralisation, the Environmental Management Law (EML) established a couple of co-ordination mechanisms, the Decentralised Environmental Management National System and the National Coordination Commission. Unfortunately these mechanisms were not used during the devolution of environmental competences from the MoE to provinces and municipalities. As a result the *juntas parroquiales* and the territorial circumscriptions were not included in the transferral process. Also there was no mechanism in the transfer agreements to allow the sectional governments to coordinate, consult or interact with any type of civil society organization (including indigenous and afro-Ecuadorians). This shows the central government's total disregard of the collective rights' territorial circumscriptions have on their natural resources and to comply with the spaces open for social participation. The environmental decentralization process up until now has been carried out by CONAM. This commission was created by and depends upon the president's office. Not much difference from the old centralised state! Here we can see how laws by themselves do not foster social participation, if the state does not provide the real mechanism social participation does not go farther than the paper upon which the laws are written.

8.12 (Un)protecting mangroves and the environment through decentralization reforms

Municipalities and provinces have been able to alternatively adopt conflicting competences or to choose the wrong ones because there has been a failure to fully examine

the technical and administrative capabilities of regional bodies assuming environmental competences and because autonomous bodies were allowed to pick and choose which competences to take up. The process has also left several voids as some municipalities and/or provinces opted not to receive certain environmental competences. During the environmental transfer process the MoE used functions, attributions and competences synonymously, as a result there is confusion about some of the competences transferred to regional governments. Some of them are in reality functions of the MoE and should never have been transferred. This is likely to erode the MoE authority and could create national mayhem if each regional body were to decide to make and implement their own local rules and policies. As a result mangroves in reality are being left unprotected.

Under the environmental transferral agreement the MoE put forward mangrove competences. As it stands provinces and municipalities will be in charge of mangrove management and administration. This is in clear contradiction with the National Decentralization Plan that established that the administration of fragile ecosystems (glaciers, mangroves, wetlands and *paramos*) are a central government competence and correspond to the MoE to dictate policies and rules to administer them. The provincial and municipal governments could help in their management but fragile ecosystems are the MoE responsibility. This piece of legislation is very clear and there is no doubt that mangroves, whether they are a protected area or not, are the responsibility of the MoE, so under no circumstance should the MoE transfer mangrove competences to the sectional governments. In doing so, the MoE is confirming that they do not really know what should be done with mangroves under the decentralization regime.

Environmental decentralization is also having a negative impact on the National System of Protected Areas (NSPA) of which the REMACAM is part. Disregarding the National Constitution and guidelines established by the Environmental Management Law and the Special Decentralization Law the MoE and CONAM has subscribed isolated agreements for decentralization or shared management of protected areas in favour of several regional governments. This is creating a series of local systems that are not connected to each other. The end result will be an administrative archipelago, where each environmental management island will be isolated from the others, with an end result of an unprotected environment in Ecuador.

8.13 Environmental decentralization: the right treatment but still an incomplete course

The outcomes of decentralization will depend on the prior structures and prior agencies in the area, their capacity, readiness and willingness to assume functions and responsibilities. Creating successful decentralised agencies and new participatory management schemes, is a long term challenge. For many years and systematically, central government has made local agencies very weak and sometimes non existent, this is especially true in the case of environmental local agencies. For example until recently the role of municipalities in rural areas such as REMACAM has been centred on bricks and mortar and environmental functions and competences have always been managed in the central office. In order to create successful decentralised environmental units the government needs to provide financial, human and technological resources and build capacities in the municipalities and provinces; otherwise instead of improving natural resource management, decentralization will increase exploitation and destroy the resources that it is suppose to protect.

As analysed in chapter 7 these capabilities are not being built in the municipalities and provinces that are assuming environmental competences. Still financial and technical resources have not been transferred nor have clear mechanisms been established for such a transfer or to improve building capacity among regional bodies. Also, the process has sidelined important local actors such as *juntas parroquiales*, territorial circumscriptions and local groups, in this way weakening the position of these important local actors, who this research has shown can play a very decisive role in the management and protection of the natural resources they depend upon. In summary, as it is happening in Ecuador environmental decentralization is like a course of antibiotics. If you take them as they should be taken for the full course you will be cured, but if you only follow part of the treatment it will harm your system, producing antibiotic resistance. The same scenario is occurring with decentralization, it may well be the right treatment, but the patient is not following the whole course.

8.14 Taking full advantage of neo-liberal spaces: the case of PCN and C-CONDEM

The PCN is using the territorial circumscription figure approved under the 1998 National Constitution to propose an autonomous black territory (CANE) in the Esmeraldas

province. If approved CANE will generate a new trajectory in natural resource management in the Esmeraldas region and the mangrove resources would be under their jurisdiction. C-CONDEM on the other hand has pressurized the government into a mangrove co-management strategy *custodias*. Under this custodial agreement, mangrove areas are allocated to traditional communities for their use, rehabilitation and management, in total more that 18,000 ha of mangroves has been given back to coastal communities, 70% of them in the REMACAM area. Since its beginnings illegal mangrove cutting has been reduced by 98%, also traditional communities groups have been strengthened and are now requesting custodial areas from the government. This process has opened up other collaborative spaces in the REMACAM, among them the monitoring of the arc cockle fishery and the creation of a local mangrove committee.

PCN and C-CONDEM are also contesting the formal education model in the REMACAM area and are proposing an Afro ethno-education system and a communitarian education program. Even though the proposals come from different perspectives, both of them are demanding a culturally appropriate education system that takes into account the everyday realities and the practical needs of the mangrove communities.

The C-CONDEM has also presented the first communitarian law to the Ecuadorian government; the law has been developed with the participation of mangrove grassroots organizations from the whole country. The aim of the law is to end the contradictory and complex legislative framework devised by the government's outsider view and includes the traditional community's insider view of the ecosystem. Through the custodial system and the new communitarian law C-CONDEM is not only giving the power back to the people, making the voices of the poor heard, but also re-establishing the common-property regime in the mangrove areas. This is an attempt to demonstrate how integrating local users into the management of their own resources enables the implementation of better and more viable mechanisms for mangrove protection and sustainable use.

8.15 Studying mangrove use and management from a holistic perspective

In the introduction of this thesis, I presented some of the conceptual shifts happening in marine ecological science and the political ecology theoretical debates around nature-society interactions. I showed how it is becoming increasingly more important to incorporate the dynamic interactions between humans and nature in the marine ecological

sciences and how the environment is no longer seen as simply an arena in which struggles over resource access and control take place. The mangrove ecosystem is ideally positioned to explore these debates and also provides an excellent setting to carry out interdisciplinary research initiatives. In the last decade there have been calls for the development of integrated approaches to mangrove research and management, yet to date the perspective of the social scientist has not been strong enough, and with some exceptions, mangrove research is still dominated by biodiversity, genetics and evolutionary biology. Natural scientific studies on the conversion of mangroves into shrimp farms have concentrated on a) the environmental impact of shrimp aquaculture; b) mangrove rehabilitation and restoration to reclaim highly degraded areas of mangroves; and c) economical-ecological valuation analysis to show the real value of mangroves. There are also some studies emerging from the political ecology front analysing the issue in terms of conflict valuation and natural asset building. Environmentalist groups on the other hand have focused in environmental justice and human rights violations. In the case of the sustainability of the shrimp aquaculture production-consumption system research has focused first and foremost on the technical problems solvable by better engineering, management systems and regulations.

In this research I have looked at the mangrove/shrimp farming issue from a combination of view points and different scales. I have looked at the environmental and economical issues arising from the development of the industry in the research area, as well as other aspects such as the role played by the macroeconomic policies, laws and regulations in the development of the industry, the importance of the mangrove defence movement in the development of new management strategies. I have also shown how local groups such as C-CONDEM are no longer passive recipients of aid, but are active actors proposing new strategies, challenging the state and pressuring the government for change.

This research has also shown how local groups (such as the mangrove communities) independently from ethnic affiliations are creating and using local knowledges in the defence of their natural resources and livelihoods. This contrasts with the tendency of researchers and development workers to look at local communities in terms of ethnic affiliations, disregarding some traditional groups that do not match predetermined ethnic categories.

A very important theoretical contribution of this research is the use of cultural representations and perceptions to analyze the roots of natural resource depletion and the successful creation of a defence strategy. Looking at natural resource management in this light allows us to bring a cultural and historical dimension to the understanding of social inequalities and environmental destruction in Latin America.

8.16 Creating new conservation and sustainable spaces

This research has shown how the development of the shrimp farming industry in Ecuador has given rise to new social organizations among the mangrove communities and how hybrid environmental narratives and local knowledge have taken a pivotal role not only in the formation of the mangrove defence movement but also in the creation of new management strategies such as the custodies and the new communitarian law: strategies that will enable the mangroves and the communities associated with them to survive.

The successful implementation of programs such as *custodias* demonstrates how integrating local users into the management of their own resources enables the implementation of a better and more viable mechanism for mangrove protection and their sustainable use. Success in the REMACAM can be considered part of the growing empirical evidence that suggests that local communities are more likely than the state to manage natural resources in a responsible way because their livelihoods depend upon it. As a case study it shows that common property systems can actually work. Common property regimes fulfil important social functions such as maintaining conflict resolution mechanisms and can also help assure conservation of natural resources and biodiversity. Above all, they allow marginalized people to participate in protecting their own livelihoods.

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Annex I - Encuesta Socio-Económica Comunidades de la REMACAM (junio, 2002)

Comunidad: _____ Fecha: _____

Nombre: _____

1.Sexo: F____ M_____ 2. Estado civil: C_____ S_____

UL_____

3. Jefatura de hogar: Masculina _____ Femenina_____ Mixta_____

4. Donde nacio:_____

5. Donde nacieron sus padres:_____

6. Donde nacieron sus abuelos:_____

7. Tiene familia en otras partes?: _____

8. Viaja (a donde): _____

9. Hijas/os						
10.Edad						
11.Sexo						
12.Escolaridad						
13. En casa						
14. Que hace						

15.Que otras personas viven en la casa:

16.Parentesco						
17.Edad						
18.Sexo						
19.Escolaridad						
20.Actividad						

Características vivienda:

21.Material	22.Techo	23. #cuartos	24.Letrina	25.Tipo cocina	26.Electricidad	27.Teléfono

28.Agua potable:

Estación	Lluvia	Pozo	Aljibe	Otros	29.Cloro	Hervida	30. Quien recoge
Verano							
Invierno							

31. TV: Si____ No____ 32. Canales:

33. Hábitos alimenticios:

Tipo	Pescado	Concha	Mariscos	Carne	Pollo	Otros	Arroz	Verde
Frecuencia								
Compra								
Producción								

34. Capacitación: Escuela y otros cursos y entrenamiento

35. Pertenece a un grupo: iglesia (religión)

36. Otras iniciativas y programas de gobierno (Bono)

37. Atención medica: programas especiales para embarazadas, planificación familiar

38. Posesiones: (Casa, Finca, Tierra, Cocotal, Artes de pesca)

Tipo de posesión	Dueño	Herencia	Otros

39.Actividades económicas: (t.1 Soazig) incluir adultos y niños (incluir: agricultura, cacería, etc.)

Quien	Donde	Qué	Dedicación	Cuanto	Aporte familia

40. Actividades no económicas: incluir adultos y niños

Quien	Donde	Qué	Dedicación	Cuanto	Aporte familia

41. Créditos (cuanto, quien lo obtuvo, quien lo paga)

Entidad	Monto	Acreedor	Uso (para que)	Quien paga

42. Acceso a otras fuentes de financiación:

43. Colección de cangrejos (cuando llegan, como los caza, quien lo hace, etc.)

44. Usos madera de mangle? (incluir construcción, carbón, leña (pasado), medicina, etc)

Uso	Especie	Época de corta	Duración	Quien colecta

45. Es importante el manglar en su vida?

46. Que pasaría si se acabara el manglar?

47. Cree que el manglar esta en peligro aquí en su área?

48. Cual seria la mejor forma de manejar el manglar (como lo hacían los abuelos)

Annex II - Actualización planes de desarrollo y consulta sobre la custodia de las áreas de manglar (Mayo, 2002)

Guía de entrevista:

Fecha: Sexo:

Comunidad: Ocupación:

Relación con el FEPP (que relación tiene el entrevistado con el proyecto manglares, es promotor, ha trabajado antes para alguno de los proyectos, etc.)

1. Sabe usted que su comunidad tiene una custodia sobre áreas de Manglar?

2. Si lo sabe, cuantas hectáreas son y cuando fue dada esta custodia?

3. Que opinión tiene acerca de esto?

4. Como cree usted que trabaja la custodia, si no sabe de la custodia que piensa usted que significa esto?

5. Cree usted que otras personas de la comunidad saben acerca de la custodia?

6. Cree usted que la custodia es importante para su comunidad? Porque?

7. Conoce usted cuales son las ventajas de tener una custodia?

8. Sabe usted cuales son las obligaciones que se adquieren al tener una custodia?

9. Sabe usted quien administra la custodia?

10. Sabe usted los procedimientos en caso que se presenten infracciones en las áreas de custodia?

11. Que hace usted si ve que alguien de fuera de la comunidad esta cortando mangle?

12. Y si es alguien de la comunidad el que corta el mangle como reacciona usted?

13. Cual cree usted que es la mejor forma de administrar esta custodia

14. Sabe usted donde están los limites de el área de custodia?

15. Cual seria la mejor forma de conocer donde están esos limites?

Preguntas sobre el Plan de manejo:

16. Sabe usted que su comunidad esta en una reserva de manglares

17. Qué significa para usted las siglas REMACAM?.

18. Sabe usted que su comunidad presento una plan de manejo para el uso sostenible y custodia de manglares? Ha escuchado hablar de este?

19. Qué es para usted un plan de manejo?.

20. Quienes se preocupan en su comunidad por el plan de manejo? Colaboro usted con ese plan de manejo?

21. Conoce usted la información que tiene el plan de manejo de su comunidad?

22. Cree usted que la información que tiene el plan de manejo dice algo sobre la realidad de la comunidad?.

23. Considera usted que el plan de manejo es importante para la comunidad, porqué?.

24. Sabe usted que los planes de manejo se los debe actualizar después de un tiempo?.

25. Si el plan de manejo de su comunidad debe ser actualizado, que le gustaría incluir?.

26. Sabe que hay unas actividades que cumplir de acuerdo a este plan de manejo?

27. Sabe cuales son estas actividades?

28. Si no ha participado en actividades del proyecto le gustaría participar?

29. Como cree usted que podría participar

Tala de Mangle

30. Ha sido cortado el manglar en su comunidad?.

31. Quiénes han cortado y destruido manglar mayormente en su comunidad?.Y para que

32. Conoce a alguien que comercializa la madera del manglar?.

33. Está ayudando usted para que no se tale el manglar en su comunidad?.

34. Se ha reforestado mangle en su comunidad?.

35. Ha participado usted de la reforestación de mangle en los alrededores de su comunidad?.

36. Sabía usted que hay que avisar a la jefatura del Ministerio del Ambiente que va a cortar mangle?.

37. Conoce usted a donde se deben enviar las denuncias sobre tala de mangle?.

38. Sabe usted que leyes defienden el ecosistema de manglar?.

39. Conoce o sabe usted que está prohibido cortar mangle dentro de la REMACAM?.

Preguntas Pesca Blanca

40. Qué piensa sobre las artes de pesca que se están utilizando?.

41. Tiene rentabilidad la pesca artesanal?.

42. A quién le vende la producción?.

43. Los intermediarios a donde llevan la pesca?.

44. Se han realizado talleres de capacitación dentro de la comunidad sobre transformación y comercialización de productos del mar?.

45. Qué artes de pesca considera usted que son destructivos para pesca?

46. Qué medidas tomaría usted para disminuir los efectos negativos causados por la utilización de instrumentos destructivos?

Recurso Concha:

47. Se ha dado cuenta que se han hecho unos corrales para repoblamiento de las conchas?

48. Sabe usted que grupos participan en este proceso?

49. Que piensa usted de estos corrales?

50. Cree usted que los corrales están funcionando?

51. Si no están funcionando, porque cree usted que esto esta pasando?

52. Cual seria la mejor forma para que estos corrales funcionaran?

53. Alguna vez seleccionó usted la concha al extraerla del manglar?.

54. Sabe usted el perjuicio que estaríamos causando al extraer la concha pequeña del manglar?.

55. Que piensa usted acerca de imponer tamaños mínimos para sacar las conchas?

56. Cual seria la mejor forma de desarrollo las actividades relacionadas con el control y monitoreo de la concha?

57. Que opina sobre la veda fijada por el ministerio (febrero-marzo)

58. Sabe usted que es una veda y que es una auto veda

59. Cree usted que se deben realizar autovedas para el recurso concha?

60. Está aportando usted para que el recurso concha no se acabe?

61. Cree usted que es necesario realizar proyectos de repoblación del recurso concha?

62. Participaría usted en proyectos de preservación del recurso concha?.

63. Que cree usted que va a pasar con el manejo del recurso concha?

64. Que piensa usted de los concheros y concheras de San Lorenzo

Recurso Cangrejo:

65. Piensa usted que la captura de cangrejo ha disminuido

66. Conoce algún proyecto sobre repoblación y engorde de cangrejos

67. Le gustaría participar de un proyecto de estos (engorde, repoblamiento, comercialización, etc)

68. Que tan importante cree usted que es esta actividad para los miembros de su comunidad

69. Cree que el precio del cangrejo es justo?

70. Que piensa usted de los intermediarios

Pesca:

Tiene redes propias? Si_____No_____

Que tipo

Que especies pesca

Con quien pesca?

Porque?

Como se divide el producto?

Pertenece a alguna asociación de pescadores?

Porque pertenece a una asociación? Cuales son las ventajas?

A quien le vende

Porque le vende a esa persona

Quien limpia el pescado

Quien mercadea el pescado

Quien empalma y arregla las redes

Otras actividades (preguntar específicamente por captura de larvas y hembras ovadas)

Es diferente la pesca en la quiebra y la puja,

Que pasaría con la pesca si el manglar se acabara?

Cuales cree que son las causas para la disminución de la pesca?

Concha:

Desde cuando concha (quien le enseñó):

Que otras actividades de trabajo ha desempeñado en su vida:

Cuantas otras personas conchan en la casa

Persona	Edad	Sexo	Frecuencia	Cantidad	

Con quien concha?

Pertenece a algún grupo?

A quien le vende la producción?

Porque?

Le da buen precio (comparado con los otros acopiadores)

Que pasaría con la concha si el manglar se acabara?

Almeja

Otros recursos malacológicos (churos, zangara, almejon, chorga, etc)

Annex III - Empirical data (Sept. 2003)

Resume of the empirical data produced during fieldwork and its state to date

1. Interview on Custody and Mangrove resources -CMRE
Includes questions on custody, management plan, mangrove cutting, fishing, arc cockle, crab resources.
Total number done: more than 100, 12 different communities
Data input: Access Data base (THESIS/Data/databases/custody&othersInterview
State: 54 records, 6 tables

2. Socio-economic survey (SES)
Total number done: more than 150
Data input: Acess database (THESIS/Data/Databases/SESurvey
State:100 records, 6 tables

3. Information on communities (CI):
Includes population data, economic activities, infrastructure
Total number: more than 30
Data input: Acess database (THESIS/Data/Databases/communitiesinformation)
State: Complete (31 records in 3 tables: datos poblacionales, actividades económicas, infraestructura).

4. Groups information (GI)
All information about the groups formed in the area
Total number: 35
Data Input: Acess database (THESIS/Data/Databases/communitiesinformation
State: Complete (One table 35 records). Copies of group rules are on word documents

5. Interview on Changes in Natural Resource use, Black Process and the REMACAM
Total number: 15
State: need transcribing

6. Community Education Questionnaires (CEQ)
Total number: 20
State: need to design database (base on Ecuador for Nina one),

7. Participatory mapping exercises (maps and drawings)
Total number: 10 comunities (some have 2 or 3 maps and drawings)
State: need to decide how they will be analyzed, and data input.

8. Biological Appraisal exercises: (Censo Camaronero, Diagnostico de la actividad pesquera). Includes diagrams, maps of the shrimp farms, information on fishing activities, description of communities, etc.
Total number: information covering all REMACAM area
State: need a resume analysis for comparison with communitarian maps, EXCEL can be used to produce detail tables. Context information.

9. Participant observation dairy: include all meetings participation, informal talks to community people, leaders, technicians, specific cases (santa rosa, el viento, Olmedo, el bajito, etc).
State: All files are in word documents, should be analyze according to subjects

10. Community Education Materials (CEM)*:
Communication and Culture (short tales on mangroves, poems, definition of communication and culture)
Total number: 23
State: need to decide how they will be analyzed, and data input.

Mental maps of communitarian development, identity (includes some leader interviews, proposal)
Total number: 40
State: need to decide how they will be analyzed, and data input.

Myths, draws of the community, work groups
Total number: 20
State: need to decide how they will be analyzed, and data input.

11. Endnote library: 385 references (includes grey literature, LA literature and reports)
Need finishing

*CEM: Análisis: comunicación y cultura, Base de datos Access para analizar la idea general y que es lo importante para ellos. Las historias se pondrán en Word para hacer un análisis de los elementos del manglar que usan al construir sus historias.

Annex IV - Migration in a small rural community: the case of Pichangal

Pichangal is a small community located in the north of the REMACAM area in the physical border with Colombia. According to oldest person in the community is very difficult to know when Pichangal first was form, there is not writing records, what he knows is that when people star arriving there was already a 25 meters palm signifying there was some other people before. Some of the people think the actual location of the community was artificially created, by indigenous from the surrounded area (maybe Cayapas). It looks like they brought soil and created and artificial "*firme*" where the houses where build, fruit tree were planted and water *pozos* were build. The "new" generation arrived 80 years ago. Some of them came from Esmeraldas y several other families came from Colombia during the "100 days war", today there is only one Colombian living there.

The community grew very well and in 1968 there were more than 30 houses, but in that year there was a big fire that destroyed more than 20 of the houses. The community was rebuild and by mid 80's there were more than 400 people living there, the community thrive with lots of shops and several of the families became very well off, but people start migrating due to the lack of schools in the area, families migrated together to the big cities, there is a neighbourhood in Guayaquil called "small Pichangal", where at least 20 families of the area can be found.

Migration trend has continue over the years in 1998 a diagnostic survey of the REMACAM area found 25 families living in 17 houses with approximately 80 people, in this research we found 13 houses of which 10 are inhabited, with 30 adults and 15 children. According to this data in 5 years the community has reduce in 44%. According to the people interviewed (in the community and locals living in San Lorenzo) the principal reason to migrate is due to problems with the school. The community has a small school with one teacher, she does not belong to the community or to the REMACAM area, so she is not been seen very often, she has open the school 43 days in 3 years. The community has travel to Esmeraldas to talk to the

provincial authorities but it has been impossible to change the teacher, so some of the families decided to leave the community and establish themselves in San Lorenzo, Limones or Esmeraldas where access to school is better.

The data below shows the age range the survey found; it is very interesting to note that the data shows a trend that was observed in the other communities, a small number of school age children and females where half of the male.

Age range	**Female**	**Male**
1 to 5 years	2	2
5 to 10 years	1	5
10 to 15 years	1	2
15 to 17 years	1	1
Total	**5**	**10**

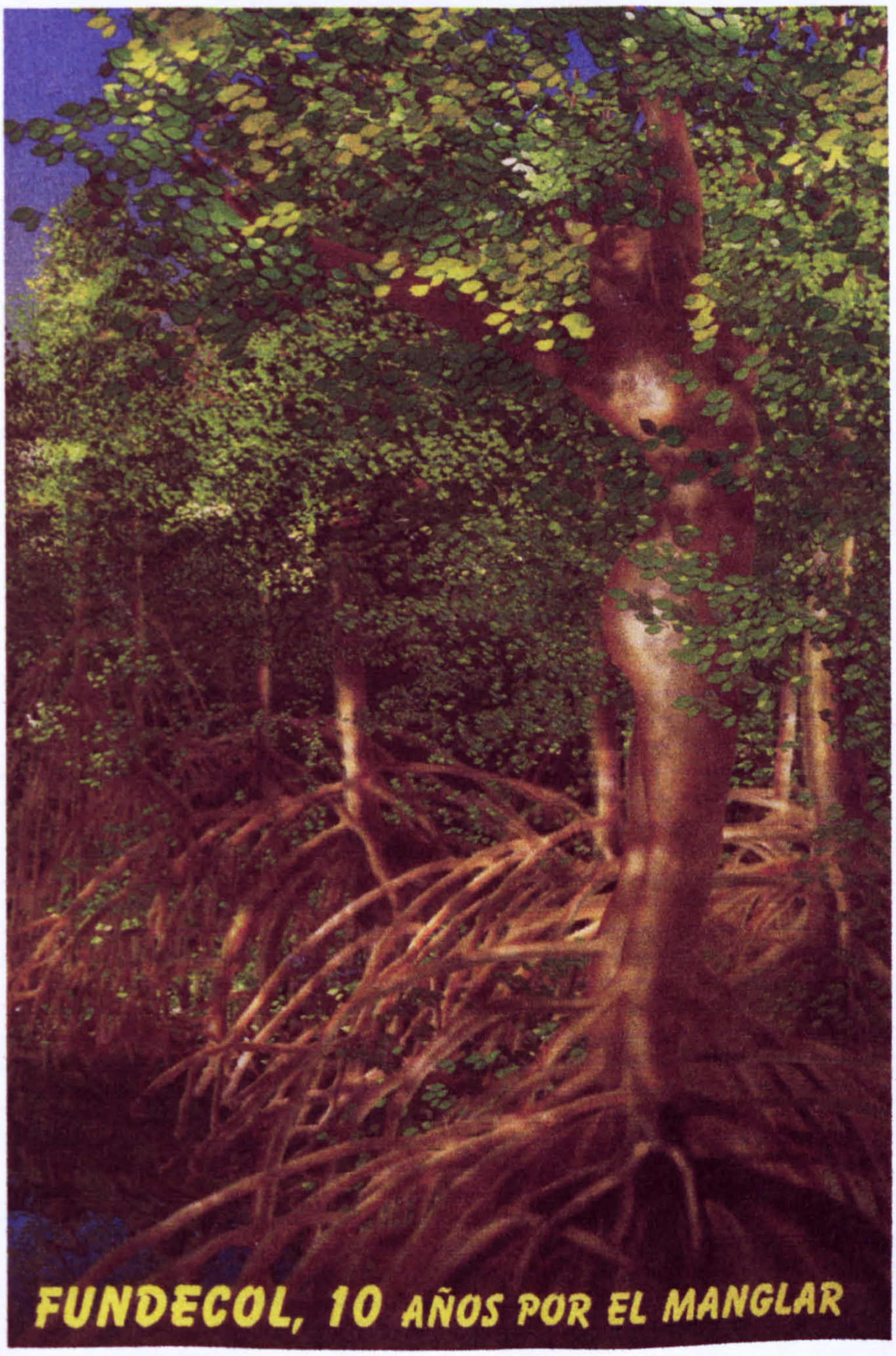
This example illustrates how the problems with school have produced a migration trend reducing the number of families in the area. What is interesting is that there good fishing and cockle gathering in the area, and the people that still live there have decent houses and access to gas and electric light.

Annex V - Direct Uses of Tropical Mangroves

Forest Products:		
•Timber, Poles	Commercial use	*Bruguiera cylindrica, Ceriops decantra Laguncularia racem*osa
•Fuelwood and Charcoal	Commercial use	*Rhizophora apiculata, R. racemosa, R.mucromata R.stylosa; Ceripos decandra, C. tagal*
Raw materials		
•Wood chips	Commercial use	*Bruguiera parviflora*
Minor forest Products		
•Tannin	Commercial and Subsistence use	*Avicennia sp. Bruguiera cylindrica, B.parviflora, B.gymnorhiza; Ceriops decandra, C. tagal; Rhizophora mangle, R. mucronata*
•Pulpwood	Commercial use	*Avicennia alba, A. marina, A. officinalis Excoeria agallocha*
•Phytochemistry	Research use	*Avicennia officinalis, Suaeda maritima*
•Honey and bees wax	Commercial and Local uses	*Aegicera corniculatum; Ceriops decandra*
•Ethnobiology (traditional medicine)	Subsistence use	*Avicennia sp.; Bruguiera eriopelata; Cerbera sp.; Ceriops tagal*
Food and beverages	Subsistence use	*Nypa fructicans; Sonneratia alba, S. caeseolaris*
Fodder, compost and green manure	Subsistence use	*Avicennia alba, A. mariana, A. nitida; Ceriops sp.; Rhizophora mangle, R. mucronata; Sonneratia alba*

Source: Hamilton and Snedaker, 1984

Annex VI - FUNDECOL, 10 Años por el Manglar, Front Cover



Annex VII - Sanction process in case of mangrove clearance

Tala de manglar sin autorización en actividad camaronera y en otras actividades.

Para sancionar la tala de manglar tienen jurisdicción el DIGMER, el Ministerio de Medio Ambiente, la Dirección General de Pesca y el juez de lo penal.

Las normas legales expresas sobre el particular prohíbe talar, podar, descortezar, destruir, alterar, transformar, adquirir, transportar, comercilizar o utilizar los bosques de áreas de mangle, sin el correspondiente contrato, licencia o autorización. También se prohíbe derribar, mutilar o descortezar uno o más árboles o injertos.

Estas provisiones están contempladas en:

1. Ley Forestal y de Conservación de Áreas Naturales y Vida Silvestre. Arts. 7, 78, 81, 82.

2. Código Penal. Art. 410.

3. Ley de Pesca y Desarrollo Pesquero. Art. 47, b.

4. Reglamento de la Ley de Cría y Cultivo de Especies Bioacuáticas. Arts. 13, b.; 29l.

5. Código de Policía Marítima. Arts. 18, 85, 368.

Las sanciones establecidas en las leyes citadas son de terminación de la concesión, prisión, multa y decomiso, de índole administrativo, sin perjuicio de la acción penal, ante el juez penal.

Los siguientes actos administrativos corresponden respectivamente:

1. <u>Multa / Decomiso</u>

Ministerio de Medio Ambiente

- Retención del productos, semovientes, herramientas, equipos, medios de transporte y demás instrumentos utilizados en estas acciones.

- Acta de retención.

- Remisión del acta a la Oficina Técnica respectiva.

- Inicio del procedimiento administrativo de juzgamiento para determinar a autores, cómplices y encubridores de la infracción.

- Notificación al dueño del producto retenido con el objeto de que conteste o presente las justificaciones pertinentes al caso.

- El encausado tiene 5 días para contestar los cargos formulados en su contra.

- Con la contestación o en rebeldía se haber la causa a prueba por el término de 4 días.

- Una vez cumplido este término, en cuarenta y ocho horas se dictará la resolución respectiva.

- Se puede interponer el recurso de apelación en ocho días.

- El recurso se lo resuelve en quince días. Sin embargo se pueden ordenar diligencias que ayuden a resolver la infracción.

- Cuando el caso lo amerite, se puede enviar lo actuado a un juez de lo penal, para que inicie el enjuiciamiento.

2. Prisión

Puede ser impuesta por el Capitán del Puerto, por medio del procedimiento siguiente:

- Con el conocimiento de una infracción se manda a citar al acusado.
- Si no contesta, se ordenará la detención del acusado.
- Las contravenciones de primera clase se juzgan una vez oido el acusado.
- Las contravenciones de segunda, tercera y cuarta clase, la contestación se la debe hacer en veinte y cuatro horas.
- En estos casos, se haber un período de prueba de seis días.
- No es posible proponer recurso alguno sobre la sentencia.

La sanción penal también corresponde al Juez de lo Penal, en aplicación de la provisión citada del Código Penal:

1. Presentación de la denuncia
2. Legitimación de cualquier persona o asociación de personas, a base de lo autorizado por la Constitución Política de la República, para presentar la respectiva acusación particular.
3. Procedimiento penal

3. Terminación de la concesión, permiso o licencia

Esta sanción corresponde a la Subsecretaría de Recursos Pesqueros -SRP / Dirección General de Pesca –DGP, la que se puede dar lógicamente solo cuando existe una concesión legalmente otorgada.

Por tala de manglares o incumplimiento de las obligaciones legales y reglamentarias; especialmente las contempladas en los Art. 7 y 12 del Reglamento a la Ley de Pesca y Desarrollo Pesquero.

La Dirección General de Pesca solicita un informe a la Dirección General de la Marina Mercante y del Litoral y comunicará al interesado, a fin de que se pronuncie sobre la imputaciones hechas en su contra.

Con el informe y la contestación, la Dirección General de Pesca emite su resolución.

De comprobarse la causal de revocatoria de la concesión, se enviará el informe correspondiente a los Ministerios respectivos para que se expida el Acuerdo Interministerial que declare terminada la concesión.

El Acuerdo Interministerial de terminación de la concesión debe indicar el plazo para que el concesionario proceda a desocupar la zona.

Concluido el plazo, la Dirección de la Marina Mercante y del Litoral, ordenará la suspensión de todo trabajo y procede al desalojo.

La pérdida de la calidad de concesionario, cualesquiera que sea su causa, lleva implícita la obligación de cancelar los derechos correspondientes.

Deben además pagarse las multas previstas en el Art. 79 de la Ley de Pesca y Desarrollo Pesquero.

Annex VIII - Environmental Competences to be devolved by the MoE

Tipo A: Competencias sobre Manejo de bosques, plantaciones forestales, flora y fauna silvestres

Competencias		Funciones Basicas para la operación de las competencias
1	Formular políticas en concordancia con las políticas nacionales	Establecer la política forestal y biodiversidad en concordancia con la política nacional Establecer incentivos y desincentivos para el manejo sustentable de bosques y reforestación
2	Elaborar, ejecutar y avalar estrategias, programas y proyectos de desarrollo y uso sustentable del recurso forestal y de la biodiversidad	Aprobar programas y proyectos locales Elaboración y ejecución de estrategias y programas de desarrollo forestal Impulsar programas y proyectos de reforestación, uso sustentable y conservación de los bosques nativos y de biodiversidad Promover el desarrollo comunitario en las zonas de influencia de áreas naturales (bosques protectores), propiciando la ejecución de proyectos Orientar y apoyar la elaboración de proyectos y programas de uso sustentable y conservación del recurso forestal y de la biodiversidad orientados hacia el ecodesarrollo Restauración y recuperación de ecosistemas y especies Promover y apoyar el establecimiento de zoocriaderos, viveros, jardines de plantas silvestres y estaciones de investigación para la reproducción y fomento de la flora y fauna silvestres Introducir programas alternativos que disminuyan la presión sobre los recursos biológicos
3	Emitir normas forestales de plantaciones forestales, flora y fauna silvestres y vedas, en coordinación con el Ministerio del Ambiente de acuerdo a la legislación ambiental.	Crear y actualizar la base legal provincial forestal y de biodiversidad Establecer normas técnicas para la planificación, manejo, aprovechamiento, administración, control e inventarios forestales Definir criterios e indicadores de manejo forestal sustentable Regular el aprovechamiento de la fauna y flora silvestres fuera del patrimonio de áreas naturales del Estado Establecimiento de vedas para la caza, recolección de especies animales y vegetales
4	Declarar bosques protectores y otorgar certificados de afectación de bosques protectores	Declaración de Bosques Protectores y afectación de bosques
5	Prevenir y controlar desastres y amenazas al recurso forestal	Prevenir, controlar y educar sobre incendios, plagas y enfermedades que afectan a bosques y vegetación natural
6	Declarar áreas protegidas dentro de su jurisdicción	Identificar y delimitar usos de áreas forestales Crear, determinar y delimitar áreas protegidas dentro de su jurisdicción
7	Capacitar, informar y realizar la extensión	Prevenir, controlar y educar sobre incendios, plagas y enfermedades que afectan a bosques y vegetación natural

	forestal y sobre biodiversidad	Capacitar sobre uso sustentable y conservación de bosque nativo y de biodiversidad Ejecutar campañas de concientización y programas de capacitación para la prevención del tráfico ilegal de vida silvestre
8	Autorizar y controlar el aprovechamiento, la comercialización interna y la tenencia de la flora y fauna silvestres (excluye productos maderables)	Autorizar el aprovechamiento comercial de productos forestales diferentes a la madera Otorgar licencias de caza y pesca y de actividades de recolección de especies y elementos de la vida silvestre Proteger las especies nativas de flora y fauna Supervigilar la producción, tenencia, aprovechamiento y comercialización de materias primas forestales (excluye productos maderables) y la tenencia de flora y fauna silvestre, especialmente de especies amenazadas o en peligro de extinción.
9	Elaborar y ejecutar planes de Ordenamiento Territorial sobre la base de la política y las normas nacionales establecidas en esta materia	Identificar y delimitar usos de áreas forestales Clasificación de usos de áreas forestales Elaborar planes de ordenamiento territorial provincial
10	Administrar el registro forestal y otorgamiento de patentes de funcionamiento de establecimientos forestales	Inscripción en el Registro Forestal y otorgar la patente forestal Registrar actividades forestales (bases de datos)
11	Concesionar el uso tradicional de manglares y humedales a comunidades locales	Concesión del uso a comunidades locales para el aprovechamiento sustentable de manglares y humedales

Tipo B: Competencias sobre Gestión de la Calidad Ambiental

Competencias		Funciones básicas para operar las competencias
1	Formular políticas en concordancia con las políticas nacionales	Formular políticas y estrategias ambientales con sujeción a la Constitución y a la Ley de Gestión Ambiental
2	Emitir normas jurídica y técnicas previa coordinación con el Ministerio del Ambiente, conforme a la Ley de Gestión Ambiental	Crear y mantener la base legal sobre control y prevención ambiental Emitir y aplicar normas técnicas, manuales y parámetros de protección ambiental aplicables en el ámbito provincial en coordinación con el Ministerio del Ambiente Establecer normas técnicas de calidad ambiental y niveles máximos de contaminación Emitir la normativa sobre la protección de agua, aire y suelo Regular el establecimiento de incentivos relacionados con el mejoramiento tecnológico que asegure la óptima calidad ambiental Fomentar la utilización de procesos industriales que generen menor carga contaminante (producción limpia) Establecer mecanismos de recuperación de costos de contaminación (contaminador–pagador)
	Sancionar de acuerdo con las normas y regulaciones en calidad Ambiental	Fomentar la utilización de procesos agroindustriales que generen menor carga contaminante (producción limpia)
3		
4	Establecer mecanismos para prevenir, controlar, sancionar y corregir	Mantener registros actualizados sobre agentes contaminantes; publicar listas de sustancias contaminantes y; normar su uso

	acciones que contaminen o contravengan las normas vigentes	Consolidar los registros sobre agentes contaminantes, publicación de listas de sustancias contaminantes. Prevención y promoción de la calidad ambiental Mantener registros sobre información relacionada con la prevención y el control ambiental Declaración de alertas y emergencias por contaminación y adopción de medidas emergentes Participar en las acciones para la atención de emergencias ambientales Establecer y operar sistemas de permisos de funcionamiento de actividades industriales y de servicios Establecer y operar sistemas de permisos de funcionamiento actividades agroindustriales y de servicios Prevención y control de descargas y contaminantes Control ambiental (normas, estándares y calidad del agua, aire, suelo, etc.) Controlar la incineración de residuos patológicos e industriales Controlar la emisión de fuentes móviles Controlar depósitos y almacenamiento de material contaminante Controlar depósitos y almacenamiento de material contaminante altamente peligroso Controlar emanaciones, vertidos, disposición y uso arbitrario de contaminantes Intervenir en la ejecución de programas especiales para la atención de zonas críticas
5	Realizar auditorías ambientales dirigidas a las actividades productivas o que puedan causar daños ambientales	Realizar auditorías ambientales nacionales y control de la contaminación derivados de la ejecución de planes nacionales y regionales
6	Formular sistemas de de evaluación impactos ambientales	Aprobar estudios de impacto y planes de manejo ambiental para obras, proyectos y actividades de conformidad con la ley Determinar obras, proyectos e inversiones que requieren estudios de impactos ambientales
7	Formular y ejecutar el plan de prevención y control de calidad ambiental provincial o cantonal, así como los indicadores de su gestión	Evaluar y desarrollar planes y programas de prevención y control de la contaminación Planificar y ejecutar acciones para el control ecológico y ambiental provincial Elaborar, aprobar y ejecutar el plan ambiental en su jurisdicción
8	Promover la participación social relativas al mantenimiento y mejoramiento de la calidad ambiental, el uso, y operación de tecnologías ambientales sustentables	Promover la participación de la comunidad en la prevención y control de la calidad ambiental
9	Dar asistencia técnica a través de programas y proyectos a organismos públicos y privados en el control y aplicación de estándares específicos de calidad ambiental.	Ejecución de programas y proyectos de asistencia técnica a industrias (incluido la aplicación de estándares de calidad ambiental) Ejecución de programas y proyectos de asistencia técnica a agroindustrias (incluido la aplicación de estándares de calidad ambiental)
10	Capacitar.	Elaborar y ejecutar planes, campañas y otras actividades tendientes a la educación y difusión de la problemática de la contaminación ambiental
11	Manejar la información ambiental dentro de su jurisdicción	Mantener un sistema de información provincial (banco de datos)

Source: Real-Lopez, 2004